ADVENTURES OF FUTURE SCIENCE

March

WONDER Stories

HUGO GERNSBACK
Editor

A GERNSBACK PUBLICATION

"RED APRIL, 1965"
By Frank K. Kelly

Other Science Stories
In This Issue

"THE FINAL WAR"
By Carl W. Spohr

"THE ETERNAL WORLD"
By Clark Ashton Smith

"WAVES OF COMPULSION"
By Raymond Gallun

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ON THE COVER

this month taken from Frank K. Kelly's "Red April, 1965" we see the American ship being destroyed by the ray from the spinning ball. The ball is a creation of the power of the three enemy control ships, and upon it the fate of the great war depends.

NEXT MONTH

"THE REIGN OF STAR-DEATH"

by A. Rowley Hilliard

The great chorus of applause that greeted Mr. Hilliard's "Death from the Stars" led us to ask him for a sequel. We felt that the mystery of the "Death" was not fully explained, nor had its career of terror ended. From this marvelous sequel we see that the terror has but begun, and that before it ends it will have plunged civilization into as great a crisis as it has met.

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"THE ELECTRONIC SIEGE"

by John W. Campbell, Jr.

Mr. Campbell's humorous story, "The Derelicts of Ganymede" was a huge success. He shows now that he can do more serious work, with as much skill and power. This story has many unusual aspects, it has strange adventures on another world, and a scientific theme that is audacious and yet convincing. There is a mystery to be settled on an inhabited world; strange kidnappings and disappearances in space; a colony of scientific experimenters who defy the rest of humanity. This is the background and skeleton of an amazing series of adventures; of how one man upset the careful plans of a powerful organization.

FOR OTHER STORIES FOR NEXT MONTH
PLEASE TURN TO PAGE 1175

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MARCH
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These nationally-known educators pass upon the scientific principles of all stories.

WHAT IS LIFE?

By HUGO GERNSBACK

THIS is the question asked by Dr. Willis R. Whitney, the famous director of the Research Laboratories of the General Electric Company.

His reasons for asking, are quite significant; because of late he has experimented a great deal with life and discovered many new and puzzling things about this "incredible phenomenon" which has puzzled men of all ages. Since the discovery of Radio, Cathode Rays, X-Rays, and Cosmic Rays, a good deal of experimentation has gone on to try these radiations on insect pests such as the boll weevil, corn borer, moles, etc. The results are interesting, in that it was found that the larvæ of practically all insects can be killed by cathode rays and X-rays; but the trouble is that, at the present time, the cost is excessive.

Furthermore, there is much complexity in these experiments and researches for, as Dr. Whitney points out, X-rays are a kind of invisible light, as ultra-violet light is. It is well known that animals seem to need ultra-violet rays, to develop bone, and they have been used with success to fight rickets, a disease of children. On the other hand, ultra-violet rays may be actually radiated upon food, and this food given to animals with curative effects.

Other experiments performed by Dr. Whitney are still more astonishing. We all know that plant and animal life requires oxygen: you can suffocate a strong man or a tree by cutting off the air supply. So the idea seemed simple to kill insects in a granary by merely exhausting the air, or by gassing the insects. It should work; but the trouble is, it doesn't. The results of Dr. Whitney's experiments were surprises in almost all cases. When pure nitrogen gas was substituted for the usual atmosphere, weevils still wandered around for some days without seeming to worry about the loss of oxygen. Then the experimenters substituted hydrogen. Promptly the insects lay down to rest, like a bear or woodchuck in the winter. But, as soon as the normal air was introduced again into the granary, the insects assumed their normal activities, as if nothing had happened.

This lead Dr. Whitney to ask: "How long can a goldfish live in a cake of ice, or a turtle buried in the mud, and how long may life last in seeds?" Some seeds last half a century and longer. So, asked Dr. Whitney, "What is Life?" We don't know, and may never know.

Another test upon insects that the experimenters tried was the so-called "radio fever," which increases the internal temperature of animals above the normal point. But the experimenters soon found out that insects can resist more fever than it was possible to give them. It was also found that grain in a granary can be protected, more or less, by heating it to a temperature at which the insects are actually killed. But, first of all, this method is expensive; and secondly, while the insects were killed, their eggs were not affected, but sprang to life in their normal time. So it will be seen that this too did not solve the problem.

One of the most interesting experiments which Dr. Whitney's men tried was on ordinary hen's eggs. Instead of placing them in an incubator, the eggs themselves were placed in the open air at room temperature, and subjected to a mild internal radio fever. At the end of their twenty-one day cycle, the chicks punctured their shells without any other incubation—a most astonishing thing, if you stop to think about it.

Even stranger is the case with smaller organisms, such as microbes and bacteria; which cling so tenaciously to life that it is almost impossible to kill them in living tissues without actually destroying the tissue itself. At least, we have not found any means to reach a number of disease-carrying bacteria today effectively. Take such a comparatively "simple" thing as the common "cold." We know that it is caused by filterable bacteria; but so astonishing is their tenacity of life that the strongest chemical solutions (which instantly kill insects and other higher forms of animal life) do not seem to affect the bacterial life at all. It seems that it cannot be reached by such chemicals. The more you dose an affected mucous membrane with poisons such as silver nitrate or argyrol, the faster the microbes or bacteria seem to dig themselves into territories where they can no longer be reached by the destructive chemicals.

THE FINAL WAR

By Carl W. Spohr

(Illustration by Paul)

The unprotected bodies of the civilians twisted in the agonies of CBX gas. A scream was cut short in the next load of high explosive rushing down.

THE FINAL WAR

WITH a soft click, the door of the elevator opened into the living room of the Young apartment. When John Burke stepped into the room, the door closed behind him, melting into the buff-colored wall, leaving no apparent trace. On the opposite wall appeared in softly luminous letters the words: "Mrs. Young is dining" and "Mr. Young is dining."

The rather large room was furnished with extreme simplicity and excellent taste. The table and chairs were of noble and beautiful shape, their color matching the soft one of the walls and the thick carpet on the floor. There was no ornament in the room, save a single sculpture in the art conception of the period, a group of purely aesthetic shapes, made of a dull, silvery metal.

Portraying nothing especial, only designed to caress the senses of the observer, it was a fitting ornament for this room, that with its soft, subdued colors, restful furnishings and utter silence emanated the atmosphere of a serene, cultured and almost decadent refinement of the twenty-first century. One of the smaller walls was taken up entirely by a window, made of one huge plate of clear glass. Over green tree tops outside, the sun was sinking into the grey mist, that always hung over the industrial areas of Irontown.

John Burke fell into one of the big chairs before the window. He was a young man of rather slim build, dressed in a suit similar to those worn in the twentieth century except that buttons had been superseded by invisible zipper arrangements.

Burke's eyes followed the sinking sun with a dreamy, longing expression. He did not notice that behind him the wall opened, and that another man stepped quietly and timidly into the room.

"Hello, John. Deep in history again?"

"Hello, Fred. I didn't hear you come."

Fred Young was about three years older than Burke. He was taller and sturdier, than his younger friend. This together with the fact, that he was about to graduate from Irontown College, gave him a certain superiority over Burke.

CARL W. SPOHR

MANY attempts have been made in the past to picture what a future war will really be like. Good stories have resulted, and many of these we have printed in our past issues.

But not one of those stories approaches this brutal, vivid, and eloquent story of Mr. Spohr. He knows war, not as one who read about it, but as an artillery officer in the German army who went through four bloody years of the hell of 1914-1918.

In picturing the utter devastation of a future war, Mr. Spohr has wisely not used the names of any nations. There is no attempt here to show one side as wrong and the other as right. To our author that makes no difference. The thing that is uppermost in his mind is to show so completely the suicide of another great war that nations will simply refuse to fight. We hardly know of any story that we would be more proud to print than "The Final War." It is truly the "All Quiet on the Western Front" of the future.

"You historians all seem to get funny notions," he smiled. "Did you see the *News* yesterday? Professor Smith certainly made an ass of himself, talking about the accomplishments of the old conquering races. What did those fellows do, except kill a lot of innocent bystanders?"

"Maybe they made men," Burke said thoughtfully. "You know, Fred, sometimes I think Smith is right. Of course he is funny with his whiskers and his veneration for old slogans. But I think he is right when he says that we are getting soft. What is our life today? Dull and monotonous. The worst that happens is that the automatic food server in our private room gets out of order, and that a man gets beef instead of synthetic salad, while he is in a peaceful and aesthetic mood.

"Exertion? Yes, I know what you mean. Sports. They are only games. And some day a girl excels us in them. Only yesterday, Anne beat me in a swimming race we had in her house tank. This morning they showed old films from the records in the college library, pictures of the war 1914-1918. Crude affairs these films, no color, no stereoscopic depth. But you could see what was going on. They were men, Fred. I tell you, it was ghastly, but it was great."

Young became serious. "You have been reading too much of that old stuff, John. I can't see anything great in sticking a bayonet into another man's belly. And anyhow, these things are past. They had hardly any air-fleets, they had crude, weak explosives and artillery with a couple of miles range. And even with that they could hardly afford what they did. They mussed things up pretty well, and it took them quite a while to get readjusted. Today they would blow each other to pieces in a couple of days, and it would take centuries to get back, if ever.

"Why, it's preposterous, and they know it. The governments know it, and the peoples do. Who would want to fight? I wouldn't. And thank heaven the people on earth have at last enough liberty to decide for themselves what they want to do. If you talk of heroes of history,

there is only one for me: John Upman, the founder of the doctrine of free conscience.

"And mind you, since his ideas have soaked in, there has not been one war during the last century. That's why I have not been bullied by all that newspaper talk about a war coming. I know it looks rotten. This so called 'balance of power' in the world and all those loaded guns are nasty playthings. But I believe in the power of common sense."

THE voice of a woman spoke from the background of the room: "You speak like my boy, Fred, but like a boy. I hope you can keep your optimistic viewpoint after you leave college. Your father had to think differently, when he fought his way through life."

Young's mother had entered. She was a white-haired, slender woman with youthful and kind face.

Her son turned around in his chair. "Father must have been a fine man. But I will never think differently. I know that father had to fight. But his opponents were in the wrong. And didn't he conquer at last?"

On the elevator wall, a luminous spot appeared, showing a miniature picture of a face. It was the smiling face of a girl.

"It's Anne," Young said and pressed a button under the arm-rest of his chair. A few seconds later the elevator door clicked open.

Anne Warren stepped into the room. She was a girl of twenty, pretty and well groomed as most girls of the period. Her entire well-proportioned body radiated health and the joy of living.

"Hello," she laughed, "what's the matter with this gloomy assembly? Moping around in the dark and playing with some of John's cheerful history, I suppose. Push one of your buttons, Fred, and put some light on the subject. There, that's better.

"You better watch your son, Mrs. Young, he is growing to be one of these old-fashioned professors. I met him in the 'U' this morning, coming out of one of the physical labs. He was talking to old man Sikorsky, and he didn't see me. You should have seen his face, Mrs. Young. The professor looked youthful beside him."

Young smiled. "We were talking about the world peace meeting in Liberty tonight. He is going with us, John. He is coming here with the sub. I drive over. We ought to make the five hundred miles in less than two hours."

"You had better watch out, that you don't bump into a traffic cop, when you take my boy friend in the air." Anne Warren laughed, but there was a tender ring in her voice. She took Burke's hand, that was hanging from the arm-rest of the chair.

Burke turned his face. He almost kissed her when their eyes met, but he held himself back. It was not customary for twenty-first century people to give signs of affection in the presence of others, even if they were good friends. "Did you hear any news in the sub?" he asked.

"O yes. They had all the screens going. I couldn't help hearing and seeing. All about this war talk. Some nasty notes from the East Empire, and about nothing. Air maneuvers too close to the border, I believe. Well, it will be history soon. By the way, Johnny, I have a choice bit of cultural history for you. You know the Shriners that have the apartment under us, don't you? Old man Shriner is an iron worker in the Excelsior Plant. Well, the house engineer told me that he had to enter their place on some urgent business. I think the elevator was fouled. Great embarrassment. Old man Shriner and his whole family were around the table, eating and drinking roast beef and beer. Reveling like in the times of old. You have been telling me of the old times, when people were eating together. Imagine Shriner digging his teeth into a cut of roast beef and smacking his lips. Enough to give anybody a nervous breakdown."

"It is interesting how old customs survive," Burke said.

Anne laughed. "Yes, you almost kissed me five minutes ago, with the public looking on. Fred, can we go to your room? Johnny wants to kiss me."

"Certainly." Young pushed another button, and the door to his private room opened.

After the two young people had disappeared, Mrs. Young said: "It is peculiar how customs change. My mother told me that in her youth it was improper for two lovers to go into a closed room. How these people must have suffered under their taboos. Well, it was about the time, when the tobacco prohibition was lifted."

Her son said: "The doctrine of free conscience was too new even then. There is the professor."

The face of Professor Sikorsky appeared on the luminous wall. Young pushed a button.

Professor Sikorsky emerged from the elevator. "Good evening, Mrs. Young. Hello, Fred. All set? Where is Burke?"

"In my room, saying good-bye to his girl. They won't see each other for two full days."

The professor laughed. He had merry, twinkling eyes and a high, pale forehead. "Funny stuff, this organic life, isn't it? These affinities, powerful, worse than any chemicals. Nice girl?"

"Anne Warren."

"Well, well, able girl, I should say. Too much athletics perhaps, but bright fellow. She asked me a couple of good ones about Foster's new electron theory the other day. There she is."

HAPPY and smiling Anne stepped into the room. "Hello, Professor. Give me one of your good cigarettes, will you? Try his cigarets, Mrs. Young, they are made especially for him."

"A pleasure to serve the ladies," Sikorsky opened his cigarette case. "But, boys, I think, we are better on our way."

Young arose. "Let's go." Before he stepped into the elevator he said to his mother: "Everything will be well, mother. The common sense of the people will prevail."

"Yes, my boy. Good-bye."

The elevator door clicked shut, the two women were alone.

Mrs. Young was sitting in her chair. Anne was at her feet on the floor. Looking up, she saw that the elder lady had tears in her eyes. "He will come back, Mrs. Young."

"Yes, he will be back. Forgive me, child, that I cried in your presence. It is bad taste to do it. But some day you may learn, what it means to be a mother. I am afraid."

"Oh, this thing will blow over. And Fred would not fight anyhow. He is too level-headed."

The older woman did not answer. After a while she said: "Do you love your John?"

"I can't tell you how much. And I don't know why. I only know, I love him. Maybe it is because we are made for each other. The eugenics official who examined us said so. Maybe I like him so much, because he is not as big and strong as Fred for instance. You know, John has some of those old-fashioned ideas about the man being the boss and a fighter and so on. But I am his match, and it will be just the right proposition. Even when we fight I enjoy it. Oh it is so wonderful to be alive."

The mother stroked her hair. "It is, child, it is. Never forget that it is. Stay with me tonight, Anne. I feel lonesome, and so do you. The two boys we love are gone."

The flying machine rose in vertical flight from the flat roof of the house. At a height of four thousand feet it took one of the high speed traffic lanes. Young set the controls of the machine, switched the collision radio controls on and had his hands free, save for minor adjustments. The beacons, marking the road to the City of Liberty were under them like a string of glittering jewels.

Young turned to the professor. "Did you hear anything new about the situation?"

Sikorskys' voice was grave. "I didn't want to say anything, while your mother was with us. I got some unpublished reports from Klein of the *News* Agency. We are practically mobilizing."

"Why, they are crazy. How can they? Who ordered it?"

"Nobody, just war maneuvers. The whole world is making war maneuvers with full equipment. The 'balance of power,' you know. No reason for it, just a game of those nitwits that are in love with their guns. It started long ago, nobody knows who started. Since then the nations are putting stuff on the balance. Some more war machinery here, some more there. The whole world is neatly divided into two equal weights. I could give you the front line, going around the world. It practically exists today. The only thing is that they are not firing—yet. But if one gun goes off, they all do. And a lot of drunken kids are playing with the lanyards right now."

"It is ghastly. The people have to put a stop to it."

"Well, let's hope for the best. That's why we are going to Liberty. Some big men from the other side are there also. I hope, it isn't too late." The professor lit a cigar.

Burke looked through the cabin windows. Down there on the ground square miles of iron plants and steel mills lay in ruddy light. Burke had a vision of wars, that humans had fought in past centuries. Like speaking to himself he said: "If they start a war, I will go and fight. It must be great, to show oneself worthy for love and life."

Young looked forward, where a faint glow of light began to appear at the horizon. "Don't worry, John, they won't start a war. They must not.

"I can see the lights of Liberty. We must be off a couple hundred miles yet."

His friends, occupied with their own thoughts, did not answer.

The plane overtook other ships moving toward the lights of the capital. The traffic became heavier. One of the gigantic transoceanic airliners whirred by with rows of lighted portholes, the transparent covering of her sun decks glowing with multicolored light. There was a dance on deck.

The city came closer. The "Crown of Liberty," the famous night ornament of the city, became discernible. Eight hundred gigantic searchlights, arranged on roof tops in a circle ten miles in diameter, pointed their beams upward in a steep angle, forming a huge cone. The tip of the cone, where the beams met, was one blotch of white light, as though the air, bombarded by electrons, had become incandescent.

The industrial centers of Liberty were under the plane, miles and miles of factories, oil refineries and iron plants, with smokestacks and grotesque steel structures, bathed in red, murky light. Then again came stretches of residential districts, low, four- or five-storied buildings with flat landing roofs and quiet streets between, where the light of street lanterns shone through the foliage of big trees.

Young projected the helicopter screws of his machine and, gradually slowing down, brought the ship to a lower traffic level.

Before him the "Heart of the World," the commercial center of Liberty, towered into the night. The big business houses rose, one behind the other, as huge luminous shapes. Bombarded by searchlight batteries, they seemed transparent and alight from within. Colored rows of lights fringed their edges like glittering jewels, tinted their glowing walls with softly colored shades. Above them the beams of the "Crown of Liberty" hurled the light of millions of candlepower against the tip of the cone, where an incandescent cloud floated in the night sky. Airships flitted through the beams like gleaming insects. But in the center of the cone stood like a sparkling jewel, Industry Tower, the tallest building of the world, a colossus three hundred stories high, topped by the famous domed assembly hall.

"We have to land on a parking house and take the L to the Industry Tower," Young said. He brought the ship down on a flat roof at the fringe of the inner city. An attendant took care of the machine and the three men boarded an elevator to the L station ten levels deeper.

CHAPTER II

War!

TWO tracks of trains took care of the L traffic in either direction. The fast express on the outer track never stopped, while the local on the inner track accelerated and decelerated between stations, taking electromagnetic contact with the moving express and enabling the passengers to change trains for their respective stations.

This transfer was done automatically. All occupied seats in the local moved over into the express, as soon as contact was made. After his transfer into the express the passenger had only to choose a seat marked for his station, and the transfer into a local was effected automatically at the proper contact. The wheels of the trains touched the rails only, when the trains slowed down. While the cars were up to speed, they floated on repellent magnetic fields, that also propelled the trains with considerable speed.

While the passengers were on the express, they were at perfect ease. The vicious acceleration and deceleration in the locals was made less nauseating by scientifically designed, cushioned seats.

Local trains stopped every two minutes. On the station platform the three men took seats waiting for the next train. The local rushed into the hall like a large, buzzing caterpillar. The doors clicked open along its length, the seats with passengers emerged, sinking through the floor into the lower exit level, while the newly occupied seats slid into the train, the doors clicked shut and the train lurched ahead. Contact with an express was made in twenty seconds. In ten seconds more the transfer was effected, and the local stayed back, while the express shot ahead with never changing speed. The passengers picked their station in the opposite, outer row of seats. The choice of the proper seat was facilitated by the fact that the seats to the farthest stations were always in the front of the train.

Young leaned back into the deep cushions of his seat and took in the spectacle of the great city. He had seen it hundreds of times, but he could not ward off the thrill of elated pride, that came over him everytime he saw it. Objects close to the train were just blurred bands of light, but farther away the walls of gigantic towers stood like glowing rocks. Deep in the canyons of the streets flickering bands of traffic moved on many levels, the swooping ribbons of the L tracks hung in graceful, improbable curves over the depth. Air taxis flitted between the buildings under and over the bold spans of slender bridges. The entire picture was bathed in a warm, diffused light, coming from the innumerable jewels of the "Crown of Liberty."

Young did not see the news picture, that appeared on the entertainment screen of the L car, he saw the picture of human accomplishment outside. A warning light flashed. His seat moved, a local made contact. The soft hissing of pneumatic cylinders, the clicking of doors, and Young's body was pressed into the seat by the deceleration of the local.

On the station the three men took an elevator to the assembly hall. "It is great to live in our time," Young said.

The professor's merry eyes looked troubled. "Did you see the news? I hope our great time does not go to pieces."

The elevator stopped. A door opened to the balcony, surrounding the assembly hall.

Below was the city—above, a huge dome of light. Young stood awed. "You say your old wars were great. Can anything man made be greater than this?" he said to Burke.

Burke did not answer, his eyes were on the dark horizon beyond the dome of light, that surrounded them.

"Look." The professor gripped Young's arm. "Some more war maneuvers."

At the corner of the balcony stood a sinister machine. Three monstrous outstretched spider-legs of steel had taken a grip in the stone flags of the floor. From a box-like, bulky form a long steel barrel pointed its nose into the night sky. Along the graceful banister of the balcony, piles of long-shell cartridges were stacked up, ready to be put into the greasy conveyor machine, that would feed them into the breech of the gun. A number of soldiers in heavy grey uniforms, steel helmets on their heads, bulky pistols strapped to their waists, lounged around the piece. The group looked strangely out of place, the machine with its businesslike, sinister ugliness and the stolid men in their heavy, drab uniforms.

BURKE stepped closer. "Beautiful beast," he remarked. "Heavy anti-aircraft automatic. It fires up to a hundred rounds a minute, each being sixty pounds of explosive and steel."

Sikorsky asked one of the soldiers. "What are you boys doing here? Maneuvers in Liberty?"

The soldier pointed his thumb toward the ammunition stacks. "It don't look like maneuvers to me. It's the real stuff, fifty-fifty HE* and anti-combustion gas. They must expect visitors." He shrugged his shoulders and turned away.

In the assembly hall a big bell sounded. Sikorsky looked at his watch. "Only ten-thirty, and they are calling the meeting to order. Something must have happened. Let's go in."

They presented their credentials, as delegates of Irontown College, at one of the entrances. Th large, domed hall was packed with delegates of all countries and from all centers of science and education. About thirty per cent of those present were women and girls.

The speaker had just mounted the platform in the center of the hall. While the men from Irontown found their seats, his voice, amplified by correctly positioned loud-speakers, began to fill the hall.

"Brother delegates. I greet you, and I thank you, that you have come. I hope that the high purpose of our meeting . . ."

Young was using the small binoculars hanging before his seat. He saw that the speaker was interrupted by an excited little man who had climbed the platform. There was a confused mumble in the loud-speakers.

Finally the voice of the speaker came again, this time distorted by excitement: "Brother delegates. It is true, we are practically at war. We are invaded by three of the greatest air fleets ever seen. You all heard of army concentrations near our border. We had counter-concentrations, as it has been customary for the last six months. This evening an accident happened. Bombs were dropped on a village across the border. It is not known who dropped them. Fifty soldiers and one hundred civilians were killed. Local air battles started, led by unauthorized commanders. Eventually our forces retreated by order of Congress. Ten minutes ago three enemy formations, each numbering thousands of ships, crossed our border. One of them, only five hundred miles away, is headed for Liberty."

For a moment there was a tense silence in the assembly hall. The drone of an airplane passed by outside. It seemed incredible. An air fleet headed for Liberty. It could not be, it was a ghastly dream.

A young, dark-haired man jumped on the platform, pushing the speaker aside. "Brother delegates, it must not be. Congress has to act, at once, before more blood is shed. It is crazy. There is not the least reason for a war. The peoples don't want it, the governments don't want it. Somebody dropped a bomb. That is not a declaration of war, it is an accident. The guilty persons have to be punished, full satisfaction has to be given. Air formations have crossed our borders. It is a demonstration, a bold one, I admit, but it is not a declaration of war, we have not heard of hostilities by the invading fleets.

"The governments don't want war. You all know how

* High Explosive.

the nations of the world are grouped. The newspapers have been telling us for the past months about the maneuver fronts. Is there a logic in this division of the world? None.

"It is not races that stand against each other, the human races are divided on both sides. There are no economical reasons that clash, we have learned in the past centuries that we need each other. There are no differences of government, of religion or philosophy, that distinguish the two sides more than the allied nations one from another. There is nothing but blind accident and the blundering, crooked ways of the men, that we have entrusted with the fate of our countries. They have built up this preposterous 'balance of power' only to have an excuse for their guns and soldiers. One of the guns went off. Shall we fire the rest of them and bring untold misery over mankind? Shall we . . ."

A man, a head taller than the speaker, had mounted the platform. He brushed the smaller man aside and began to speak, undisturbed by a protesting crowd around him. "Fellow men, the enemy invades our country, carrying death and destruction to us and our families. What does Congress do? Calls our fighting men back. It is a shame, we are at the mercy of . . ."

Suddenly the hall went dark. The loud-speaker system had been switched off also. The voice of the speaker came thin and unintelligible from the distant platform. Then the booming voice of the loud-speakers, switched on with full power, roared through the darkness.

"Citizens. This is the Council of Four, speaking through police headquarters, Liberty Center. Congress has been dissolved. The Council has taken the supreme command. The state of siege is declared for Liberty and suburbs. All assemblies are prohibited. News comes only through the agencies of the Council. Three air fleets of equal strength are reported from the south, estimated strength of two thousand combat ships and five thousand bombers each, with an estimated load of thirty thousand tons. One unit is headed for Liberty, one for Irontown and one for Harbor City. The Council advises all citizens to dissolve assemblies and take shelter in basements. All traffic is suspended at once. All electric power, except for military purposes, will be shut off at eleven-fifteen. The unit headed for Liberty is expected over the city at one-thirty. Defense is being prepared, and the Council has the situation well in hand. Reports will come through all public loud-speakers every fifteen minutes. Next report at eleven-fifteen."

A TURMOIL of excited voices filled the hall. What was this "Council of Four," that had taken the power from the age-old government of the people? Men struggled on the platform, trying to make themselves heard. Others rushed the exits, there were mad panics in the dark.

Young felt his friend beside him. "Irontown! We must make it."

"Yes, we must. Anne and your mother."

The professor grabbed Young's arm. "Didn't you hear, that there is no transportation? You would not reach the parking house before morning. And if you would get there, they would not let you have your ship. And even with that, you would reach Irontown after the raid."

Young saw that the older man was speaking the truth. "But what can we do?"

"Nothing. Wait. We might just as well stay here. They probably will use high explosives and gas. Gas is illegal, but so are air raids and all wars. Up here we are comparatively safe, if they don't score a direct hit on the tower. And the guns may keep them away. Here, take a cigar."

The dark hall had emptied. Only at the exits people were struggling for the elevators and stairways. The men sat down. Their eyes having been adjusted to the darkness, they could distinguish the outlines of the high, arched windows, the rows of deserted seats and the speakers' platform.

The loud-speakers boomed again. "Intelligence Army Watervliet speaking. Eleven-fifteen p.m. Air-raid formation progressing in direction Liberty attacked by anti-aircraft forces of Watervliet. Two bombers and one combat ship brought down. Formation progressed with increased speed without returning hostilities."

"They ought to be here around one o'clock," Sikorsky said. "They seem to save their stuff for us. Let's go out on the balcony. I see the south exits are clear." His voice echoed hollow through the dark hall.

At the exits they stumbled over the bodies of men and women, that had been trampled to death in the panic.

Outside, the starry night sky was over a dark city. It was strangely quiet. The gunners at the anti-aircraft automatics spoke with muffled voices. Here and there along the banister were huddled forms of men and women who had thought it best to await their fate where they were.

The three men of Irontown found an unoccupied stone bench. They sat down without speaking. Somewhere in the dark a woman wept. Her voice was high pitched and monotonous, it reminded of the wailing of an animal. Every fifteen minutes the booming voice of the loud-speakers came through the open doors of the hall, marking the progress of the air fleets.

Time passed slowly. The peoples' nerves were breaking down. The voice of a man yelled: "Why don't they do something? Where are our airmen, the cowards." There was a shuffling of feet, a dark figure leapt over the railing.

Midnight was past. The beautiful, tall silhouette of a girl was before the stone bench. Her proud profile stood against the starry sky—a strange expression of curiosity was in her face. Young remembered her picture after years.

There was a commotion around the guns. The clear, sharp voice of an officer called commands. The listening devices had picked up the enemy.

Ten minutes later a faint hum began to fill the air. Gradually it became discernible that the sound came from the south. At the horizon was the flicker of artillery fire and then the muffled booming of anti-aircraft guns.

The hum in the air grew, became a loud, singing drone. In the south suddenly hundreds of searching light beams flitted to and fro. With one flash the "Crown of Liberty" came back to life. But the beams of the eight hundred lights did not unite in their usual cone, they pointed southward, where the drone of thousands of propellers grew into an overwhelming roar.

In a streaky sheet of light appeared tiny glittering shapes. Dozens of batteries opened up on the target at once. Their distant booming was drowned in the vicious

reports of the guns on the balcony. The automatics had begun to pump their projectiles into the shrieking air—in hammering, pounding rhythm the barrels jerked back and forth, while the projectiles clicked one after the other into the breeches. The bright flashes of shell bursts appeared as sparkling rows between the ships, and the brown blotches of anti-combustion gas* were like orange-colored, spreading curtains in the beams of the searchlights.

The foremost group of bombers was caught in the gas barrage. The AC gas, sucked into the gas-turbines of the ships, prevented combustion of the fuel mixture and made the engines useless. Gliding down helplessly, the ships let go their load. The first bombs were released.

Rows of blinding flashes appeared, and then the noise of tremendous, rocking explosions tore the air. And new rows of flashes and new explosions came, until an incessant flicker of bursting bombs lit the dark areas in the south.

Young felt nauseated and sick. He knew the area, where the bombs were falling now. It was Sunnyside, one of the residential suburbs. The cry of a woman cut like the shriek of an animal through the pounding of the artillery. "They have killed my children in their little beds, my children . . ."

The fighting spread out at both sides. The flash of bursting bombs and firing artillery lit the entire horizon. A formation of bombers, coming from great altitude, tore in a roaring power dive through the gas clouds and reached the inner city. The explosions of their bombs shook the foundations of the Industry Tower. Some of the ships fell, receiving direct hits from anti-aircraft guns, others crashed between the structures of the city, after being caught in gas clouds. Combat ships began to attack searchlights and guns.

A flight of ships swooped down from nowhere on the Industry Tower, materializing suddenly with the roar of propellers, the hammering of machine guns and the crash of explosive bullets, answered by the rattle of machine guns on the roof of the assembly hall. The new tracer explosive ammunition showed its terrific effect. Ships were ripped wide open and changed into clouds of flaming fuel. One of the automatics was silenced, about fifty soldiers and civilians on the balcony were killed or wounded. The other automatics kept on firing with utmost rapidity. Fighting had become more and more confused, it had spread over the entire city. Command seemed to cease. Guns opened up on any target that they saw, ships released their bombs as soon as they succeeded in reaching the areas of the city. The rain of falling shell fragments filled the air with its hum, the gas veil from AC shells became heavier and heavier.

CHAPTER III

Shambles!

THE three men from Irontown had taken shelter under an overhanging part of the hall structure. The professor pointed southward, where flaming objects fell vertically in a wake of red sparks. There were more and more, dozens, then hundreds of them. "Our air forces must have arrived," Sikorsky yelled through the noise of the barrage, "they are attacking the higher ships."

*Anti-combustion gas discovered by Dr. H. Preston in 1964 might be called anti-catalyst. Its presence alone served to prevent the combustion of fuels.

The attack had come as a surprise and from an unexpected direction. The bombers without the protection of combat ships were an easy prey. Hundreds fell before the raiders recognized the danger. Their combat forces climbed frantically, to gain altitude. Most of their ships could not rise much, because in the meantime the entire atmosphere had been contaminated with anti-combustion gas. Hundreds and hundreds of pursuit ships swooped down on them. They were equipped with the latest, secretly developed powerplants, burning a mixture of fuel and liquid air, that made them independent of the atmosphere.

The raiders, hampered by the sluggish action of their motors, fell in droves before a rain of explosive bullets. In two minutes their rout was complete. The anti-aircraft stopped their fire, leaving the rest to the airmen. A few minutes later the drone of the motors and the rattle of machine guns moved away to the south.

The City of Liberty was quiet again. The battle had lasted only fifteen minutes, since the first bombs had fallen. The searching light beams disappeared. Exhausted gunners stood at their hot pieces. The confused action of the air battle died in the south. In the dark was the moan of the wounded. Sanitary troops appeared with stretchers, the smell of ether and carbolic acid followed them.

From the hall came the voice of the loud-speakers. "Intelligence Agency Liberty Center speaking.—Air raid on Liberty ended with annihilation of raiding forces. Damage by bombs heaviest in southern residential districts, unimportant in Liberty Center and industrial areas. Number of dead and wounded uncertain. Rescue work hampered by gas. Air raid on Harbor City and Irontown ended with same results. Heaviest damage reported for Harbor City in commercial dock yards, for Irontown in Rosehill and Briargate Suburbs."

"Rosehill Suburb." Young had anticipated it, when he had seen the destruction brought over the suburbs of Liberty. But still he could not believe that the quiet township, where he had left his mother in the evening, was now a desert of black, poisoned ruins.

The professor was the first to speak. "Perhaps it isn't so bad. We might try now, to reach our plane and get back." He didn't believe that it was possible, but anything was better than sitting here and thinking.

The two young men did not answer. They arose and walked to one of the stairways. Light fell through the high windows, soldiers were turning part of the assembly hall into an emergency hospital. Like an unconcerned observer, Young saw on the stone floor the body of the girl that had stood before him two hours ago. It was mangled terribly by an explosive bullet. Even in death the expression of cool curiosity had not left her proud face.

Sikorsky carried a flashlight. Its feeble beam stabbed through the darkness of deserted corridors and stairways. Sometimes dark shapes huddled in the corners, wounded, that had succumbed after they had dragged themselves so far. Deeper and deeper the men went, passing level after level.

Finally they reached a balcony, from which bridges spanned the streets to the neighboring buildings. In the grey dawn the details of the city became discernible. There were buildings ripped wide open, others, that were only

twisted steel skeletons. Torn L tracks hung like ribbons from their structures.

The men went on between the buildings, crossing bridges and balconies. Sometimes they had to detour, when a bridge was broken down, or the smouldering debris of a fallen ship blocked progress. Daylight had come. Down in the canyons of the streets was a white fog, gas that still lingered in the depth.

Here and there, air traffic began to move between the structures. At seven in the morning the three men succeeded in hailing an air taxi. Five minutes later they were on the parking building. It had not been damaged. An hour later the elevators of the parking house worked again, and Young received back his ship.

They rose into the air. Big black blotches marred Liberty Center, the "Heart of the World." Some of the suburbs were only crater fields.

The ship was headed for Irontown. Down on the ground industrial and agricultural areas alternated, a smiling world in the light of the morning sun, unconscious of the horror of the night.

There were the smoke stacks of Irontown.

"I think you can land, even if they have gassed," Sikorsky said. "According to the smoke quite a breeze is going. There is the University, they have not hit it. It is quite close to the Excelsior Plant."

Young let the plane drop. With horror he saw the stretch of desert, that had been Rosehill Suburb. He could hardly find his way. There was not one house untouched. The trees stood bare, their leaves plucked off by the force of explosions, their trunks splintered into brushes. Huge, black craters gaped everywhere.

"There." The professor pointed to a torn, leaning structure. His observing eye had found Young's house. The ship hovered with whirring helicopter blades. "I think you can land in the crater behind the house."

YOUNG brought the machine down. On the bottom of a black crater the men alighted. They climbed up to the house. It was leaning dangerously to one side, big gashes in its walls. All windows were blown out. There was no sign of life in it.

"Try the fire escape."

The three men climbed up to the third floor. The back door was hanging loosely on its hinges. They entered. There was the living room. Nobody spoke, it was dead silent.

They entered an open door. Splinters had torn big holes through the walls. The older woman was in bed. The girl's body was sprawled over the floor in a pool of blood. Her open eyes, staring at the ceiling, had kept the expression of helpless agony.

Young stood beside the bed, his arms hanging down. His mother clutched the picture of a little boy in her hands. She had bled to death in her bed.

Young did not know how long he stood.

"Come on in, boys, might just as well start up here." A sergeant and three soldiers, carrying sheets, entered. "Sorry boys, we have to take 'em away. Orders."

He gently pushed Young to the side. "Sorry, buddy, it can't be helped. My Gawd, you have no idea what we had to see this morning. They were lucky. You shoulda seen those that died from gas. Come on boys, easy now."

The soldiers were in the door with their loads.

"Sergeant," Young's voice was unnaturally calm. "Where is the nearest recruiting office?"

"A couple hundred yards east on what used to be Grace Street. A big, yellow tent. Infantry."

Young turned to Burke. "Do you go with me?"

"Yes, Fred."

Young took Sikorsky's hand. "Goodbye, professor. If you can use my boat, take it. The keys are in it. You go back to the 'U,' I suppose. You had nobody to lose."

"I will take care of your plane, Fred, until you come back. I hope it will be soon. Goodbye. Goodbye John. I hope I see you again in better times."

Three hours later Young and Burke, wearing the coarse, heavy uniform of infantrymen, were in a transport train that rushed with top speed through its subterranean tube to a distant training camp. Together with the making of new large armies the work of decentralization had begun, all stores of fighting men and material were spread far over the country.

The training camp was overcrowded with volunteers. The air raids had killed a little over two million people, most of them in the less protected residential suburbs. About two-thirds of the victims were women and children. The Council of Four, that had contemplated a draft, ignoring the doctrine of free conscience, found it for the time being unnecessary to release the draft proclamation. The young men, enraged by the slaughter from the air, flocked to the colors, eager for merciless, revengeful warfare.

There was little chance for another air raid in big scale. During his weeks in the training camp, reading between the lines of censored bulletins, Young learned by and by, what had happened. The ruthless attacks on Liberty, Irontown and Harbor City had not been the only actions taking place. At the same time all large centers of the allied countries in reach had been attacked in the same merciless manner without a previous declaration.

EVERYTHING had taken place according to a well-prepared plan, that represented a bold attempt to start and end the war with one crushing blow. The flaw in the plan had been that the general staffs had underestimated late developments in the anti-aircraft devices and espionage systems of the attacked countries. The plan was known and countered effectively at all points.

The raiding forces had been held at bay by anti-aircraft devices, protecting areas of strategic value. In the attempt to break the gas and explosive barrages of modern, rapid firing machine cannon, the raiders had been scattered and weakened, until they became the prey of specially equipped combat flights. The air forces of the raiders, constituting the bulk of the air fleets, had been practically annihilated.

Even before the last bomb had exerted its effect, the air forces of the raided countries had taken the air for the counterstroke. At four o'clock in the morning they had rained explosive and gas on the cities of the enemy. But they also had been met by unexpected means of defense, that kept them away from strategic targets and reduced their number to a frightful small percentage.

The strategic value of the air raids had been surprisingly small, and the slaughter of non-combatants appalling. The opposing air fleets had been practically annihilated. Seeing themselves without effective ships, the

opposing dictators had renewed the old treaties, that outlawed air raids and bombardments on non-combatants.

In the meantime the fighting on land had settled down very quickly to a certain routine. Fortified fronts had existed practically before the air raids. At actions, that took place in the first days of the struggle, the new defensive weapons proved to be terribly effective. Both sides were now in defensive positions, waiting for the next move of the opponent and for the time when the industries behind the front would have strengthened their fighting machinery for a decisive blow.

All industries were reorganized and put into the service of warfare. Owners and workmen learned overnight, that they lived under absolute dictatorship. There was little and no organized resistance. The air raids had made warlike nations out of peace-loving, independent, free-thinking peoples. Old traditions, that had been buried for the last century, awoke to new life. Men again thought it honorable to die fighting, and praised discipline as the highest human virtue. A spy and police system of enormous reach and power, the "Secret Service," was created. Free speech and thought were suppressed by all means, the very souls of the people were pressed into the single purpose of war.

With the reorganization of the industries, other steps were taken that proved to be of great importance in later years. All industries, necessary for warfare, were decentralized, scattered and camouflaged as much as possible, and all scientific work was gradually put into the service of the war. Eminent scientists received overnight an officer's rank and were put in charge of new and mysterious laboratories.

Young saw how the world around him changed. He felt that he himself had changed. How different was this life in rough, crowded barracks from his former, well-balanced manner of living. Young saw his life in the laboratories of the university, and in the quiet Rosehill, his mother and his former friends like seeing them from very far away. Everything had been cut off suddenly and entirely. What was left for him was to fight for revenge, like men of old, like savage peoples had fought. Young did not believe in the ethic aims of this war, as they were outlined in the high sounding bulletins of the secret Council of Four. John Burke felt different. He always had believed in traditions more than his friend, the sceptical physicist. He saw himself now as the sacred avenger of his murdered sweetheart.

The fateful events of the first war days had made the friendship of the two men a very deep one. Young often turned to his younger friend as to the only person on earth, that was left for him. Except for this comradeship he felt himself only a savage. To stay together as long as possible, the two men resolved to volunteer together for the next transport to the front.

Occasion for this came soon. They were not three months in the training camp, when a requisition for several thousand men came. Of their company of a hundred and fifty men, forty were to go. Young and Burke were among the few that volunteered for the transport. The men, that had gone to the camp with them, had changed. Days of wallowing in the soil, the terrific effect of explosive bullets on the rifle targets, gas practice and vague rumors about the front had given them the feeling that they were being trained to march against ghastly, mysterious horrors. They already sensed that they would die at the front, and in the animalistic instinct of self preservation they felt no urge to hasten this impending moment of extinction.

CHAPTER IV

At Grips!

THE transport marched during the night to the railroad station. The little country town, where the railroad station was, watched them passing by. Men saw them with burning eyes: "Go boys. You are our hope for revenge and deliverance." Heavy boots tramped the pavement. Girls in light, colored dresses, flowers in their hands, marched beside the clatter of arms: "Come back, boys, we are waiting for you."

The companies stood lined up at the station, the trains came. Men stood bareheaded on the platform, girls waved flowers and handkerchiefs, when the train moved out. Young realized for the first time since the air raid, that he still loved this world, that he left behind. He tried to think: "They are waiting for us, and I will come back."

Whizzing through their subterranean tubes, the trains carried three thousand young men toward the front. Three thousand young men were in merciful ignorance of their fate, like millions more, that moved up for the great fall offensive. They believed in steel helmets, that protected their heads; gas masks that protected their lungs; machine rifles with explosive ammunition, that were terrible fighting weapons, and they trusted in their luck.

They left the train two days later on a ruinous station. The sky was black, it was night and raining. A peculiar, flickering light was at the horizon. They moved through a nightmarish, muddy landscape. Terrible, unknown noises were in the dark, in ever increasing intensity. They groped their way through confused trench systems, splashing through water, not knowing where they were going.

Before daylight they landed in dripping caves, where strange, grey-faced men sat around flickering candles. The soldiers, that had lived for two months in this strange world, were men with muddy uniforms and unsteady, thin hands.

Outside was an ever increasing thundering roar. Grey-faced, muddy officers came and told them to get ready. Men stood in wet, crumbling trenches, while a grey morning dawned .A dark wall of splashing shell bursts stood before them. The officers made strange, winking motions with their arms. Out, forward.

Clutching their rifles they went over the top. Before them wandered the black wall of shell bursts. Creeping, black monsters wallowed beside them through the mud. They went on for miles, the enemy was gone, annihilated.

From a ridge before them flowed a yellowish gas. The gas masks slid in place. The men marched on into the yellow fog, not knowing where they were going.

An unbearable, burning pain went over their bodies. Men rolled on the ground, racked with agony, tearing their gas masks off and dying. Some stumbled on into the gas cloud, some crumpled up and died where they were. The attacking waves stopped, but before they had moved back, the gas had surrounded them, and they died. The enemy

had used a new gas, Denhaline, C46,* that had never been known before. It was the latest invention and the pride of his warfare chemists. It owed its cruel efficiency to the fact that it worked on all living tissue, eating through the skin and causing a slow and very painful death.

Young and Burke were in the second wave of the attacking forces. They saw the first wave break down in the gas cloud and the advance turned into a mad run for safety. Suddenly the rattle of machine guns was in the fog, explosive bullets crashed in splashing rows in the mud. Men fell stumbling, dim, gigantic shapes of tanks swayed in the gas. On the last ridge, that they had crossed, the attackers took position in shell holes, firing blindly into the yellow fog. The gas kept on coming. They felt already a burning, nauseating pain creep over their bodies, when a sudden gust of wind blew the gas back. Heavy artillery projectiles came howling, exploded with muffled thuds, throwing up thick gushers of yellow, clinging gas. Again the attackers retreated, and again the gas kept on coming.

All day they retreated before the creeping gas cloud and dodged projectiles, that carried the gas among them, until in the evening a strong wind came up.

The two friends had stayed close together. In the night one of the transport tanks, gathering the wounded, found them in a shell hole. The gas had eaten large, festering wounds into their flesh. They had given up and lay down to die. They couldn't go on anymore. And they had seen nothing of the enemy.

The gas, the first big surprise, that the ever developing art of warfare brought over the soldiers, was analyzed, copied and manufactured as "CBX gas" a week later by the chemists of the allies. It made necessary a complete change in the equipment of the troops. But before this change was effected, the enemy had muffled the offensive of the allies in burning, etching gas clouds, and had pushed his own lines ahead for hundreds of miles. His advance was stopped only before the tunneled receiving positions, that had been prepared since the beginning of the war.

THIS new type of field fortification proved impenetrable, while the attacking forces in their trenches were shredded to pieces by the massed artillery of the defenders. Trench warfare began to prove impossible before the development of artillery. Trenches are limited targets, visible at least from the air, and the principle, that recognition and annihilation of a target are equivalent, proved more and more to be true.

The new fortifications were invisible lines of tunnels, reaching the surface only in lines of small points, equipped with concealed weapons. After enormous losses the aggressors had to admit that their advance was checked, and they were forced to imitate the new fortification manner. From this time warfare became a continuous struggle for the recognition and bombardment of tunnel entrances and combat points.

During the disastrous gas offensive, that brought about the greatest change of lines during the war, Young and Burke suffered in the hospitals behind the front. Especially Burke, who was burned more severely, was for weeks between life and death.

But after three months the two friends, wishing to stay together, volunteered for the front again. They were just in time for the second ghastly surprise that came over the soldiers. While the chemists were at work, the physicists had not been idle.

Young and Burke reached the combat positions of their regiment, after tramping through trenches and tunnels for days. They were better equipped this time, and CBX gas had lost much of its horror, since the uniforms had been adapted for it. The rim of the new, closed steel helmets was clamped down directly onto the joint around the neck of the heavy, air-tight uniform. The visor plates of the helmets, made of heavy unbreakable glass and hinged over the face of the wearer, could be closed instantly by the snap of a spring, shutting off the outer air and admitting air for breathing only through a filter.

Even this filter could be closed by a valve, which at the same time opened a small tank of compressed air, enabling the soldier to breathe like a diver, independent from the outer air and exhaling through a check-valve. This protection had been found necessary, after thousands of men had been killed by new gases, that were not neutralized by the air filter. The only drawback of this arrangement was that the air tanks held out only for an hour. Even the hands of the men were protected by air-tight gauntlets, for gases worse than CBX had been invented, poisons, that made the slightest opening in the uniform fatal, and even the touch of objects, contaminated days before, meant painful, lingering death.

The ventilation of the body inside the closed uniform had been worked out to the last possibilities, but in spite of this the continued wearing of this cumbersome armor was painful and tiresome, and skin and blood diseases were frequent. Due to the difficulties encountered on the way to the front lines, the troops could not be relieved often, and gas proof shelters, in which the men could live without their uniforms, could not be maintained in all parts of the lines.

The regiment was stationed in the "Liberty Sector." Since the great gas offensive, Liberty was only a hundred miles from the front, dangerously close even for the range of modern artillery. But the renewed treaties, that outlawed the bombardment of non-combatants, had held so far.

Young and Burke on returning to the front, after recuperation, found the conditions in the front lines changed entirely since that one disastrous day that had sent them to the hospital. Instead of trenches and dugouts they found a maze of tunnels, hastily fortified with mining lumber, and narrow shafts, leading upward to small combat stations under flat, camouflaged cupolas of steel or concrete. Life in the positions had settled down again to a dull routine, a game of hide and seek with the enemy. Artillery bombardments came like sudden thunderstorms, smashing a number of combat stands and caving in a number of shafts and tunnels. But generally the front was quiet because the artillery commanders knew that betraying one's position meant annihilation. Small party attacks were tried, generally at night time.

After a month of this life, Young and Burke did not feel like recruits anymore. They had developed into grey-faced, stoic, fatalistic men, into the universal type of

* Devised by a German Gerhard Flieger in 1931 and sold by him to a secret syndicate who then sold it to the enemy of the allied forces.

front soldier, that looked and acted the same on both sides of the front. When their hour came to man the hidden combat stations, they did so, knowing that they might be blown to pieces in the next minute. When reconnoitering attacks were made at night time, they went out, if they were ordered to do so, and coming back knew that they had been lucky. And any time they expected to feel the effect of new lethal inventions, employed by the unknown monster "enemy."

ONE evening in March, Young went to relieve the observer in one of the lookout turrets. Climbing the narrow shaft to the cupola, he became aware of a peculiar, paralyzing pain in his body. Halfway up he could not go on. In the twilight, filtering through the observation slit, he saw the man in the turret motionless in a strange, unnatural position.

Young knew at once that the observer had been disabled by some new, fiendish method of killing. He tried to call, but he could not open his paralyzed jaws. He tried to climb down, but only with the utmost concentration of will power he succeeded in moving his limbs. Deeper in the shaft the effect of the mysterious war device diminished.

Thirty seconds later the intelligence of the new enemy weapon reached the commands farther back. It came from different points simultaneously. In a width of twenty miles all lookout and combat posts in the first lines had been disabled or killed. In this area it was utterly impossible to reach the surface of the earth. It meant only one thing, the enemy was preparing for an attack.

Almost simultaneously the entire artillery of the sector opened up on the areas where the tunnel exits and combat stations of the enemy were suspected. Light, heavy and superheavy artillery concentrated with utmost fire rapidity. The enemy artillery returned the fire, without being able to silence the barrage batteries. The effectiveness of this barrage, that lasted for an hour, saved the day. The attackers, that stood massed for the assault, were crushed or killed by air-pressure in their tunnels, the exits and combat stands caved in and the mysterious paralyzing machines were put out of action, one after the other, by blind, accidental hits of the barrage artillery.

At eight o'clock Young was back in his lookout station. The body of the killed observer had been sent back for examination. No man's land, a grotesque, sterile moonscape, was quiet again, except for the occasional flicker of muzzle flashes and the confused rumble of distant explosions.

At ten o'clock Young was relieved. When he unscrewed the joint of his helmet in the sleeping tunnel, to turn in, an orderly came. He read off thirty names. Young and Burke were among them. "Come to the captain's tunnel at once. Full assault equipment."

"That means a night raid, John." Young replaced his helmet, took his cartridge belts and filled his grenade pockets.

"Let's stay together if we can," Burke said.

"Yes, it may be good for something."

The captain sat over a little table, covered by a map. Four of the lieutenants were with him. The captain's face was grave. "We have orders to capture one of the new enemy devices. They are probably electrical machines. Ten men under Lieutenant Schwarz will go first, trying to get across unobserved. If they are detected, they will give the signal for barrage by a red star light. Under cover of this barrage the other twenty men with Lieutenant Steger and Lieutenant Vilain will make a second attempt. The first party will start at ten thirty-five from exit B317. The second party will wait in shell holes near the exit, to start out with the beginning of the barrage. Do your best, boys. I thank you gentlemen."

Young and Burke were among the second party. The thirty men and three officers crawled through a narrow fox hole into the open. The night was dark and quiet. As no gas was reported, the men had left the visor plates of their helmets up for better vision and hearing. From the shelled barrage zone came a peculiar smell of bitter almonds. Single infantry bullets, fired from silenced rifles, whistled overhead.

The first ten men disappeared like noiseless shadows in the darkness. The two friends were side by side in a large shell crater. Slowly the minutes passed. "They must be over by now," Burke whispered. In the dark before them was just then the crash of hand grenades and the crack of explosive bullets. A red star light rushed into the air.

Seconds later the air screamed with artillery projectiles. They were up, Young felt Burke's hand clasp. Stumbling they ran through the darkness, the air was torn by explosions. Young felt, that his friend was still beside him. By the white, cold light of a star shell he saw men falling in grey smoke. Somewhere a machine gun rattled.

The friends kept on running toward the thundering barrage of their own artillery. They saw the flashes of rifles before them and dropped into a shell hole. There were four men in it. One of them raised a knife. Then he saw that he had men of their own party before himself. They threw their hand grenades into the dark, where they had seen the rifle flashes. Roaring, a howitzer projectile of their own artillery came down before them. Two of the six crumpled up. The other four jumped forward. One of them, Lieutenant Steger, fell, his head blown off by an explosive bullet. The other man, a sergeant, was torn in two parts by a shell fragment.

Young and Burke fell into another shell hole, they were alone again. There was a strange, sweetish smell in the air. Another star shell showed that the crater was filled with mangled bodies. Half hidden under the corpses was a bulky cylinder, from which thick cables coiled. Suddenly the friends realized that they had stumbled across one of the machines. Frantically they dragged the heavy thing from under the mangled corpses.

Grabbing the cables, that were cut by shell fragments, they dragged the machine over no man's land. Their luck seemed to hold out. Instinctively they ran straight for the tunnel entrance.

Suddenly Young's legs did not obey. He fell. Burke let go of his cable. "Hold on," he gasped.

Young realized the first pain from a shell splinter in his thigh, when Burke pushed him into the tunnel entrance. Weak from loss of blood and pain he closed his eyes, while a sergeant dressed his wound. Burke was out in the open again.

"I got it, Fred." Burke bent over the wounded friend, his uniform smeared with mud and blood, dirt, sweat and tears running over his face. "I got the machine." He

still clutched a heavy insulated copper cable in his fist. He had brought in the trophy.

When on the following day the company was relieved and marched back through tunnels and trenches, the scientists of the allies had learned the secret of the enemy's new machine. The "Projectors" as the machines were called, projected a tremendously concentrated electric field of high frequency, that was lethal for the human organism.* Three of the machines had been captured during the night at different parts of the front, but in order to do this close to a thousand men had been sacrificed. The first captured models, which were rather crude affairs, were improved soon and became in their final shape a standard weapon for both armies. The enormous expenditure of electric energy, that was essential for their operation, made the strict rationing of all sorts of energy or fuels necessary.

WHILE the company had a rest period in receiving positions, fifty miles behind the lines, Burke was decorated and made a lieutenant. He was the only man who had returned unharmed from the raid. The other two, who were still alive, were Young and a sergeant, who had dragged himself in toward morning with a mangled foot.

Young had been carried through endless narrow tunnels to the first aid station. A transport tractor had brought him during the following night to a railroad station. Now he was in a hospital again, the splinter had ripped a deep, jagged gash into his flesh. Still in bed, he was notified that he was a corporal. He also was decorated with the bronze bar medal for bravery.

"It was my luck," he thought, while his eyes followed pale, haggard nurses in white overall uniforms between the cots. "Luck and John's help, that I am living. Probably the other thirty, that were killed, were braver than I."

When he returned to his company four months later, he still limped. It was summer now. The war had lasted almost a year, and there was no end to be seen.

Young saw that warfare had become more and more deadly. A wound like the one he had received meant sure death now. The increased use of CBX gas and other poisons made a pin prick in the uniform fatal. Projectors had become terribly efficient. There were other kinds also, that broadcast their vibrating, torturing and killing waves. Their effect penetrated deep into the tunnels. Artillery was massed in greater and greater concentration. New types of tanks and ground combat planes took part in the fighting. New lethal machines and poisons were invented and tested on living beings every day.

While the new methods of warfare had made slight wounds deadly, the old custom to treat surrendering or disabled enemies as prisoners of war had disappeared. Food shortage began to be felt, especially by the civilian population of the big cities. Army orders had hinted at first that, considering the food shortage, the taking of prisoners was not desirable. Later on these hints had become strict orders to exterminate all enemy life that came in reach.

Time passed on. Month after month went by, periods of fighting in the front lines and periods of rest and reorganization in the caves of receiving positions. Day and night made no difference. The seasons passed by, hardly noticed. Nothing grew in no man's land. Spring, summer, fall and winter passed, and another year. It was always the same, only the methods of killing and torturing varied and grew ghastlier.

Corporal Young and Lieutenant Burke were still alive. If they happened to think back, they could hardly believe it. They had seen too many men die. Burke had forgotten his belief in the greatness of war long ago. There were only duties to be done. Young felt like an old man, the hair at his temples began to grey. He was hardly thirty years old. He had forgotten, that he had lived his own life in a happier world. He only knew that the soldiers had to obey the commands and duties, and he knew this animalistic instinct, that wanted to preserve the living body in this hell on earth.

CHAPTER V

Behind the Lines

IT was three years after the first bombs had fallen on Sunnyside Suburb. The killing had been going on month after month, flaring up here and there and settling down again with businesslike efficiency. The lines had not changed much.

Lieutenant Burke had been made a captain and commander of the company. It was during a rest period in the receiving positions fifty miles south of Liberty. The captain sat in his small concrete tunnel, going over the orders, that had come from the regiment's staff. He unfolded a typewritten sheet: "Captain Burke and six men of the 12/349 report for fourteen days leave at Secret Service Headquarters Liberty Center at once . . ."

"Higgins," the captain said to his orderly, "get me Corporal Young."

Higgins was surprised. Never before had he seen a smile on the face of the captain with the deep CBX scars.

Twenty-four hours later the two friends and five of the older men of the company reported in full field equipment at the S S Office of Liberty Center.

A police captain in uniform was at the desk. "Captain Burke, tell your men not to lean against the wall. We have discipline back here." He did not like the men from the front, their faces with those round, astonished eyes and their uniforms that carried poison and infection into his clean office. "Report for disinfection at station S 314, third floor, this building, when you are through here. Where do you want to go?"

"Irontown."

"Address?"

Burke remembered, that neither he nor Young had an address left in Irontown. "University, Professor Sikorsky."

"Irontown College became War Academy 613 two months ago. Miller, look up Professor Sikorsky from Irontown College."

While the clerk went into the records, the police captain asked: "Anybody of the men going with you?"

"Yes, Corporal Young here."

"All right." The captain scribbled something into the passports.

The clerk came back. "Professor W. B. Sikorsky, third

* It broke down the cells of the body, especially blood cells, producing death at once.

draft. Now lieutenant with torpedo station CX 317."

The captain looked at Burke. "Well? He won't be home. I tell you what to do, ninety-nine percent do it. You go to the soldier's home."

Without further questions he completed the passports. "Now get this: under all circumstances you are forbidden to talk to anybody about conditions on the front. Keep that in mind. The SS agents are watching. Here, take these instructions and read them. Your railroad tickets are in the passports. You report back here within two weeks from last midnight.

"All right, you two can go, I'll take care of the men."

The SS Headquarters Liberty Center occupied a huge building, that formerly had been named Transportation Building. In it all railroads, sub tubes and L structures of Liberty converged on many levels. It had been the main railroad station and the office building of the city's transportation companies.

After the two friends had been disinfected, and this fact had been properly certified in their passports, they had two hours before the departure of their train for Irontown. Young conceived the idea of spending this time in looking over the city. They took the elevator to the level of the L structures.

As the transportation within the city and its suburbs had been free before the war, the entrances to the L stations had been wide open. They were now closed by iron gratings, guarded by soldiers. Through small doors single persons were admitted after careful examination of their passports. When the two men from the front presented their passports to the guard, they received the answer: "You can't get out. Your passports are made out for Irontown. What do you want in the city, anyhow? L and subtrains are running only for military purposes and the employees of the SS."

The two front soldiers turned back and spent the remaining time in the waiting room of the Irontown railroad. The large, dimly lit room was filled mostly with soldiers on leave, smoking a poor kind of tobacco, that they had bought from the SS Canteen. In a small pen were a few civilians, mostly old men and women in shabby, worn clothes.

At last the train left. It was going half power to save current, and it had to stop often to let military transports pass. It reached Irontown toward evening.

The friends alighted at Briargate Suburb, as this station was marked on their passports. The houses around the station square were as they had been after the raid three years ago. Some were in ruins, weeds growing over their blackened, crumbling walls. Some were leaning, held upright by crude wooden struts.

THERE were very few persons on the square, and no vehicles, save some government cars with the insignia of staff officers. The entire picture gave the impression of utter poverty and neglect. The dead, leaning structures with flaky, faded paint and dark windows, the people, walking slowly with tired, timid steps, were in sad contrast with the picture that had lived in the recollection of the two returning soldiers.

They followed a sign, crudely painted on a board: "To Soldiers' Home." The street was like the square. The traces of the air raid showed everywhere, obliterated only by nature. Split trees were green again, in huge craters grew the grass. Children with thin limbs and bulging heads sat on cracked doorsteps, too tired and hungry for play.

An old woman, a little tin pail in her hand, came around a corner. When she saw the soldiers, she reeled and fainted. Burke kneeled over her and held her head.

When she came to, she said: "Oh, it's you, John. It is nothing. We old people get weak." She staggered to her feet and leaned against a house. "The hunger, John. We must bear it. You boys must bear worse things."

Burke stammered. "This is Fred Young, Mrs. Miller. He was in Irontown College also. He knew . . ." he stopped, he did not dare to inquire about her son.

"Richard is a soldier," she said. "Light field artillery. He went with the second draft. He wanted to volunteer, like you did, but I begged him to stay. You know, my husband was killed in the air raid. I was gassed, but I got over it. Only sometimes it comes back.

"John," she continued after a while, "I shouldn't ask you, because you are not allowed to speak about it. But, do you think Richard is safe? You know, they can write only every two months, and not much."

"What regiment is he?"

"1243, E battery."

"Yes, there is nothing to fear. I know where they are."

"Thanks, John. You boys must come and see me. I can't offer you anything, but we can talk. The old address, the house stands yet."

The soldiers went on.

After a while Burke said: "I heard four weeks ago, that the 1243 was cut to pieces, while going into position. They were caught in a barrage. Hardly anybody got away. I didn't know then that Miller was in that outfit."

"I remember Miller, he was a nice little chap."

About a hundred girls marched down the street. They were clad in grey overalls and heavy shoes. A squad of heavily armed soldiers marched before and behind them. They were mostly young girls, fifteen or sixteen years old, with sallow faces and meagre bodies. Passing by, one of them smiled at Young and made an obscene gesture.

A young man in a ragged uniform limped on crutches across the street. "What was that?" Burke asked him.

The invalid tried to straighten his crippled body. "Ammunition girls, sir. The recruiting office is two blocks up the street, opposite the soldiers' home." When he saw that Burke did not understand him, he continued: "I see, you come from the front, sir. They draft the girls now down to fifteen and the boys down to thirteen years for the factories and laboratories."

After the friends had walked another block, Young said: "I had to think of Anne and mother, John. Perhaps they were better off to die then."

"It is hard to understand why we cling to this life, as we do, Fred."

They stood before the "Soldiers' Home," a barbed wire enclosure with a dozen of sheet-iron barracks, that looked like a prison camp.

At the gate an invalid sergeant examined their passports. "Correct," he said. "The officers' quarters are over there, sir. Room 43. Corporal Young takes bunk 28 in barrack four. Supper is in fifteen minutes."

Young entered a long sheet-iron barrack. To either side were sleeping cots in two stories. In the center stood long tables and wooden benches. In the background were

washing troughs. At the head end of each cot was a small cabinet with a number on it.

At the table were a couple of men. They stared before themselves on the boards. Young saw that they were front soldiers.

"'Lo, boys."

"'Lo, corpril." They hardly moved.

Young found his cot and put his field equipment into the cabinet. He went to the trough and washed himself. The soap consisted mostly of clay.

When he went back to the table, the men had arisen. "Time for chow," one of them said. "They don't ring the bell anymore, makes the citizens too hungry when they hear it. They eat only once a day. There is a mess-kit and tools in your box."

THE kitchen was in another barrack. When the men lined up with their mess-kits, a number of children and old people stood with hungry eyes outside the barbed wire zone. One of the soldiers pointed with the thumb over his shoulder. "That's why they put us in this monkey cage," he explained to Young.

The soldiers ate, seated around the long tables in their barrack. The food was coarse, but comparatively good.

The man beside Young said: "Do you like it, Corporal? They're feeding us for another stretch in the tunnels. But it takes yer appetite away, thinking of them poor beggars outside."

A sergeant across the table said: "Shut up, you know what this is, don't you?" He pointed to a sheet-metal box under the roof.

"What is it?" Young said.

"Telephone to SS Headquarters. They hear every word you say."

Young thought of the sanctity of private life three years ago. People had not even eaten together. Now every word was spied upon.

After supper the sergeant took Young aside. "Listen buddy, I think that fellow is an SS man. They sneak them in here. Everytime, when somebody new comes, he sits beside him and tries to make him talk. Last week a poor fellow with shot nerves came. He broke down and talked a lot about finishing the war. Ten minutes later they were here and took him away. Work battalion. You know what that means. I would ten times rather die."

When he saw Young's face, he went on: "Otherwise it's all right here, brother. We got the best leave camp in the city. You should see the others. Too crowded and too much monkeying with discipline. They feed us well here, and inside the wire you can do what you damn please. You get up and to bed, when you want. Only they don't give us light in the barracks. We get tobacco every second day. Once in a while a shot of combat soup, government booch. If the sun shines, we sit outside in day time and have some ultra-violet on our bellies. They say it's good for tunnel dwellers."

The corporal and the captain met after supper in the yard behind the barracks. When darkness came, they sat in the grass at the edge of a bomb crater. They did not speak. Nobody spoke much in this place.

Finally Young said: "I wish I had never come home."

"And died with the recollection of the old times," Burke finished.

On the following morning the sun was in the sky. The soldiers on leave had a chance for their favorite sport. They were in the grass behind the barracks. Their uniforms pulled down, that the sun rays could reach their bodies, they looked up into the blue sky.

Young lay down beside the sergeant, who had warned him of the SS spy. Young liked the lean hatchet face of the man, his deep cut features and grey front soldier's eyes, that seemed to say: "You can't show me any worse than I have seen."

Overhead at high altitude a formation of huge bombing planes, bearing the star insignia of the allies maneuvered in the blue sky.

"They make them pretty noiseless now," the sergeant said. "And plenty of them they got."

"But there are the treaties, that were renewed after the first raids. Bombardment of non-combatants is outlawed. What do they want those bombers for?"

The sergeant laughed a mirthless laugh. "Suppose, to drop eggs on the tunnels in the front lines. Boy, those treaties are due to bust any minute. And won't they have fun. The raids three years ago will be a joke."

Burke came. "Come on, Fred, we wanted to see Mrs. Miller. It is eleven o'clock now."

Without moving the sergeant said: "No chance, captain. She is standing in line at the community kitchen now. They stand an average from ten to one o'clock, until they get their feed. I know, I've got an old aunt in town."

Burke lay down beside the sergeant and Young.

There was a brooding silence over the town and the camp. The larger manufacturing plants had been moved away into the country for fear of air raids. The front soldiers were a quiet lot, sitting motionless and staring with empty expression on the same spot for hours.

At one o'clock the two friends left for their visit. "It is ghastly," Burke said, when they were on the street. "This camp is like the melancholic ward of an asylum. Let's go out tomorrow, and have a hike. The sergeant at the gate told me we can go ten miles beyond the city limits."

They had to climb five stories over rusty fire escapes to the Miller home.

They found the old woman at the table behind her tin pail. She had finished eating. "We always eat it, after we get it," she explained. "Only the bread we save for the evening." The "bread" was a small piece of dark stuff that seemed to consist mostly of sawdust.

The walls were patched with boards and newspapers, where bomb fragments had cut through. The photograph of a young man looked from a cheap frame.

The woman smiled apologetically. "I know, it is considered bad taste to hang portraits in a home," she said. "But you see, I talk to Richard, when I see his face on the wall. Perhaps he will come home on leave soon, then I can talk to him."

CHAPTER VI

An Attack from the Skies

THE friends left after ten minutes. On the street Young said: "I'd rather leave the tunnel for a night raid, than see her again, John. It makes me sick."

The following day they set out for a hike. There was no traffic on the road, except army cars and trucks. They passed large farms where children and old people served agricultural machines, and factories hidden away in villages and parks.

Finally there was a sign beside the road: "Command limit Irontown."

"Guess we'll have to turn back," Young said.

Beside the road was a tract of woods, surrounded by a deep barbed wire zone. A soldier, an, artilleryman, according to his uniform, passed an iron gate, coming out. Seeing the captain, he saluted.

Burke returned the salute. "Going to town?"

"Yes, sir."

The artilleryman walked with the two men. Young pointed back to the tract of woods. "Is that some kind of military post?"

"No sir, it is the home of Samuel F. Rush."

"The president of Excelsior Iron Works?"

"That's what he was. He owns United Irontown Steel now. They merged most of the bigger steel plants two years ago."

"The government did not take over the plants?"

"No, only the smaller ones. The big and most efficient ones were left to their owners. What the government cares about is that they get the stuff. And they could not compete with S. F. Rush for that matter. See, I have studied national economics in my time, and I thought about it. These men like Rush, Bohlen, Swift, Van Dyne and the other big ones are men, who can produce. But it won't do, to give them a pretty uniform, a rank and so and so much per month, as they did with the little ones.

"To do things, these big men want a big arm for themselves: Power. The government has to let them go on, and so they keep on producing, merging, cutting each other's throats and taking over plants. And the ammunitions, guns, planes, tanks or what have you grow beautifully. The government supplies only the workmen."

"Are the workmen soldiers?"

"No, they are civilians. They work for wages, standard wages. They make just enough to buy quarters and food from the factory, where they are working. The government does not feed them, as they do with the old people and kids in the towns. The workmen would work for less and starve, if they had to. They know that they get a front soldier's uniform the day they are fired. I could show you some efficiency. It is better or worse, whatever you call it, than in the government plants.

"S. F. Rush surely has a nice home, back there in the woods. And tunnels, as I wish we had them in firing position. His place is a perfect, gas and bomb proof paradise, a real pre-war layout. I was visiting there, I used to be friendly with the butler's family, when I chauffeured the kid, S. F. Rush, Junior. But the funny part is, old man S. F. does not enjoy his paradise at all. The kid used to be nuts about uniforms. His tutors had filled him full of patriotism. He had a notion. that S. F's. son had to fight, as the others did.

"The old man took up the matter with the army commands, and they made the kid a captain last year. He was just fifteen then. So far, so good. But the kid wanted to see the front, he thought it looked kind of heroic up there. So they put him in the regiment's staff that had the deepest tunnel. They put six men at his heels, to watch that he didn't get hurt. Well, one day the third lines got plastered nicely with artillery. The little captain had learned in the meantime, that there were tunnel exits, and he probably thought that soldiers get medals for taking a peep at the enemy's long range activity. The six men tried to hold him in his dugout.

"But five hundred privates can't hold a captain, if he orders them to stand back. He climbed up, proud as a peacock, and was blown to bits by the first coal bin that came screeching through the air. Old man Rush went nutty. The colonel of the regiment was court-martialed, and a pretty monument was built back there in the woods. But that did not put the pieces of the little feller together. They say that the steel industry got wind of the old man's grief, and that Bohlen is giving him the run for his money now. I wouldn't be surprised, if next year United Irontown Steel were part of Bohlen consolidated."

The artilleryman, who was clever enough to see that he was not speaking to secret service spies, and seemed to have a natural liking and ability for gossip, kept on repeating stories, that he had learned from the rich man's servants. They were stories of human depravity, falsehood and intrigue in the slave camps of the war industries. Slavery, want, spy administration and the fettering of minds can devastate the human character in a terribly short time.

WHEN the artilleryman left the two friends in Briargate Suburb, he said: "They try to make it easy for us to go back. I know that we are going to get croaked sooner or later, but up to then we are comrades out there, no sneaking hounds." He spat on the pavement. "Good luck, Captain, good luck, Corporal."

"Good luck Comrade."

"He is right," Young said, when the friends went on alone. And he felt afraid that they would be separated soon.

Day by day the two weeks passed by. The two friends had given up their idea to escape the brooding atmosphere of the soldiers' home. They had joined, what the sergeant called jokingly, the "Ultra-violet Club."

Then the day came, when they took their equipment from the cabinet and marched back to the station.

They arrived in SS Headquarters Liberty Center at ten o'clock in the evening. The same police captain was at the desk. "Your train leaves at 1:22 from track 27, third level. Your men are waiting in room 12, same level."

The five comrades had found the same conditions at home. Only the hunger was not so bad in the smaller country towns.

They sat down in the gloomy waiting hall. The hands of a big clock moved slowly ahead.

It was ten minutes past twelve when excited voices and running feet approached on one of the corridors. A police officer, white-faced and shaking, rushed into the waiting room. "Air raid," he yelled. "Gas alert." He ran into the next hall.

There was a movement among the soldiers, an adjusting of straps and weapons. Civilians produced obsolete gas masks from their baggage, fumbled with air filters and holding straps.

The voice of the police officer had died in the distance.

Somebody said: "The treaties are busted." From outside came the distant booming of anti-aircraft.

The first bombs fell close. Their explosions shook the Transportation Building. The light went out. The face plates of the soldiers clicked shut.

It was quiet again. Even the booming of the anti-aircraft guns had stopped. Somewhere a woman or an old man sobbed into the gas mask.

Suddenly the world seemed to burst into one explosion. A wall of the waiting room thundered down. Through clouds of dust and smoke came the pale light of the night. There were no searchlights, only the dark, looming buildings and blinding explosions, that tore the city apart.

Then another quiet spell came. For seconds a very faint hum was audible through the reverberating echoes of explosions, until the whining rush of heavy falling bodies filled the air again, ended by peculiar, muffled detonations. The unprotected bodies of the civilians twisted and squirmed in the agonies of CBX gas; a woman's piercing wail cut the air, ended by the next load of high explosive rushing down.

From then on Liberty was one turmoil of flashing explosions, swirling gas clouds and falling buildings. Young felt the hand of his friend on his arm. He understood that the captain motioned toward the stairway.

When they tried to rally their men, they found that one had been killed by the falling wall. With the remaining four they climbed through passages, choked with dead bodies, over shaking stairways and bridges deeper and deeper down. Only front soldiers in their field uniforms had survived.

A doorway, half closed by debris, opened into a street level. Outside the street was being torn by falling debris and bombs. Burke pointed outside. "We have to make another building," he yelled through his air filter. The Transportation Building seemed to be the target of methodically bombing crews.

The men hesitated, afraid to expose themselves in the open. Burke and Young climbed before them over the debris, blocking the doorway. They were outside, when an explosion behind them closed the exit. Thirty feet of wall had been blown from the supporting construction.

When the dust settled, Burke did not rise. A splinter had torn his right leg almost off.

Young was alone with his wounded friend. He drew his trench-knife. He knew, that the air was fouled with CBX, and he had been trained what to do. In flickering darkness, cutting through cloth and torn flesh, he amputated his friend's leg. Pulling the cut-off uniform trousers over the stump, he held the opening closed with his left, while he took the clamp, that the soldiers carried in their uniforms to close cuts.

There, that would do.

Burke gave no sound. Young heaved him upon his shoulders and stumbled away with his load. Across the street was another doorway. The corporal knew that most buildings had a first aid station in the basement. He groped through the darkness of basement stairways, stumbled over dead bodies and ran against walls, always afraid that his friend would bleed to death before he would find help.

FINALLY he saw a light and felt an air draft on his uniform. With new hope he followed the light. First aid stations always had their independent emergency power.

There was a door with a red cross. He passed an air lock.

A blood spattered doctor, instruments in his hands, stood under glaring lights. Two nurses lifted the load from Young's shoulders and put it on a cot.

The corporal opened his face plate and kneeled down beside the cot. "John."

Burke lived.

The doctor was over the wounded officer. "Good work, Corporal," he said in a businesslike fashion. "Well, the CBX must have been thin, or you wouldn't have been able to save him. Maybe, we can pull him through. Whoa, hold on." The house shook with new explosions.

"Well, that's all, Corporal. You better go back to your formation. We'll take care of the captain."

Young had no formation to go back to, but he knew that he could not stay in the crowded first aid station. He touched Burke's hand . "Good-bye, John, you'll pull through all right. And then the war is over for you."

The captain's white faced smiled painfully. "Good luck, Fred."

The corporal found his way back into the open. The raid was over. In the southern skies was the machine gun fire of air combat. Single artillery projectiles came with wailing howl. The enemy had opened fire with long range artillery also.

Liberty Center was changed entirely. The air raid had been terribly effective. The raiders had succeeded in silencing the ground defenses in the beginning of the raid. Gun batteries and searchlights had been blown to pieces by a tremendous expenditure of a new type of radio-controlled air torpedoes. After that the bombing had taken place methodically and thoroughly with thousands and thousands of tons. In Liberty Center was not one building that had not been hit—Industry Tower, Transportation Building and about thirty other large and important buildings were reduced to twisted steel skeletons.

All transportation means were utterly destroyed. About seventy per cent of the human beings who had been in Liberty during the raid, three million people, were killed within twenty minutes, mostly by CBX gas. Only a little over one per cent were wounded. The rest, who escaped, were front soldiers in field equipment and persons, who had been lucky enough to be in gasproof basements. Some of the latter were rescued weeks later, when the debris had been cleared away, or tunneling parties had reached them.

When Young reached the street level, he was picked up by one of the organizing parties, that gathered straggling front soldiers, to rush them into the receiving positions fifty miles south of Liberty.

In the dawn of the morning the corporal found himself on the march through the ruined southern suburbs of Liberty. In the afternoon he reached with his emergency combat formation the prepared positions. The soldiers learned here that simultaneously with the raid huge attacks had been launched in the front lines. Weakened by the destruction of the base and command center of Liberty, the positions had broken before morning. The enemy was through and pushing on through a gap, fifty miles wide. From men of formations, that were practically

fleeing to the shelter of the receiving positions, Young learned that his regiment had been reduced to a few hundred men.

In the evening the enemy attacks on the receiving positions began, after a vicious bombardment, that lasted three hours.They were unsuccessful and were repeated with undiminished fury and unsuccessfully for weeks.

After that the lines became stable, but the "Liberty Salient" had become one of the most disputed corners of the front.

CHAPTER VII

Back to the Front

THE year after the destruction of Liberty became known as the "year of the big air raids." From both sides huge bombing formations took the air night for night, laying waste all large cities of the countries by carefully planned, thoroughly executed operations. Temporarily the development of anti-aircraft devices had lagged behind that of aircraft and demolition machinery, and all raids were of devastating effect. But the millions of people killed were mostly non-combatants, and the property destroyed was of small military value. The work of decentralization, that the strategists, anticipating the raids, had begun long ago, had progressed continuously. And the fronts held. No decision being forced. The war continued.

The greatest damage had been done in Liberty, because the city, being only a hundred miles from the front, had been an important center of transportation and command. After the enemy had advanced his lines and the first positions were only fifty miles from Liberty Center, the importance of Liberty as a base was only intensified. But as time passed, the city became less and less vulnerable. The gigantic buildings, that had been the pride of the citizens, now shielded with their dead bodies the life that burrowed under them.

Three years had passed since that fatal night of the raid, that destroyed a city and killed three million people. Bizarre masses of cracked concrete and twisted steel, that had been the City of Liberty, still towered into the skies. The bodies of the victims had been rotting in vast, rubbish-filled caverns, that had been offices, factories, residences, and were now populated by packs of huge, vicious rats.

The only signs of life were occasional patrolling air vessels, soaring as small specks in the sky or darting with incredible swiftness over the jagged contours of dead buildings. Demolition bombs, air torpedoes and the projectiles of long range artillery were still falling occasionally. Huge detonations rent the air, columns of black smoke swayed, until the dust settled again over new craters; and work battalions fighting off the rats, closed the gaps that had been torn into the protection of their underworld.

In a basement room under a gigantic rubbish pile, that had been the "Moneymaker Department Store," Young, a guide from the front lines, reported to the commander of a combat company, going into position. To the strategists who had carried on through six years of warfare, human beings were only the figures in a problem But all those human life stories, that shaped themselves between death and suffering, and were unimportant to the strategists, were all-important to the soldier as an individual.

The young commander of the combat company looked up and dropped the map that he had been studying before the guide entered. "Fred."

"Yes, John, it is just three years, that I saw you last."

"I had hoped I might see you in the tunnels, Fred. I didn't expect you here."

Young laughed. "I was with the regiment staff for a couple of days. I saw the orders. 'A new combat company B 1427, Commander Captain Burke. The regiment has to assign a competent guide.' It is kind of hard to find the way up there now. Of course I volunteered for it. I got the job, because nobody cared much to do it. How is your leg?"

"There is no leg. You cut it off." Burke laughed. "They made me an artificial one. After I had learned to walk with it, they put me in the training camp to drill recruits. Little kids, Fred, I brought hundred and fifty along. They call it combat company B 1427. We were another kind six years ago. Any of the old boys living yet?"

Young shook his head. "I am the only one. When I finally found what was left of the regiment after the big push three years ago, there were only twelve of your company. Those twelve dropped out one by one. Higgins was the last, four weeks ago. Why did you come back?"

"The colonel in the training camp told me that there was a good chance for me to be sent out with a mobile caterpillar battery. They take men with one leg now. So I volunteered for my old regiment. Anyhow, you know how things are back there, a lot of dirt and intrigue, I got pretty sick of it. And I had a hope to see you, Fred."

"Fine sight I am. Well, we make the best of it. Are any good men in your new company?"

"One, Sergeant Blake. He is an old timer, was with the transport troops. The others are kids, from fifteen to eighteen. They may be pretty good enough, when they get going. How does it look up there now?"

"Rotten. Worse every day. Well, you'll see soon enough. By the way, John, they want to put me in the laboratories in four months. Probably as a specimen of the survivors. I am to stay there six months. But if we can be together, I volunteer back to the front."

"Don't be funny, Fred. Anyhow, many things can happen until then." The captain looked at his wrist watch. "We have to be on our way. Are you tired?"

"No, I slept in Hellgate Depot. The trains were stuck, otherwise I would have been here this morning."

THE captain opened a door into the next room. "Sergeant Blake."

"Yes sir." The sergeant, a short athletic fellow stood at attention.

"Blake, this is our guide, Corporal Young. He is an old friend of mine. He probably knows more about the front than the general staff."

The sergeant extended his hand. "Shake, Corpril. I know you'll get us up there in fine shape.

"The men are ready, sir. Lined up in the RR tunnel."

"Thanks. Our train is due in ten minutes. Let's go."

They opened the iron door of the air lock. Outside was

an endless corridor, lighted dimly by lamps a hundred yards apart. The walls of the corridor, following a generally straight line, jagged back and forth in grotesque zigzags. An underground passage had been created in cutting through the basement walls of thousands of buildings.

The company, a hundred and fifty fresh recruits, stood lined up in a widening of the corridor. The men carried full equipment, short, bulky machine rifles, trench knives, stores of rifle and grenade ammunition and the enclosed steel helmet with its rim clamped down onto the joint around the neck of the air-tight uniform.

From time to time flat and narrow monorail cars shot by, packed closely with soldiers in the same grotesque make-up. "There is much traffic tonight," Burke remarked, "all going to the front."

Corporal Young's eyes followed the fleeting cars with the vacant gaze of the old front soldiers. "It seems that the 273 is being relieved. There won't be much traffic the other way though. It was tough when I left."

Suddenly his expression changed, his eyes narrowed, his body grew tense, alert, he was like an animal sensing danger. He gripped Burke's arm. "The rats."

Over the hum of the electric cars was a peculiar noise, a whistling and a rushing of innumerable active little things.

"Back to the wall, face plates down, filters . . ." The captain's command ended in the howling shriek of an alarm siren. The men pressed their backs against the wall, while a torrent of dirty brown bodies rushed down the corridor. The rats were huge, as large as cats, filthy and fat, millions of them.

For a second there was the figure of a man among them, and then the rushing bodies gushed up around this obstacle, bore down on it and floated over it. There was a struggle for the fraction of a second, a mad whirlpool of filthy, whistling demons, and on rushed the torrent down the corridor.

In thirty seconds the ghastly spectacle had ended. Where the man had been, were scattered bones and the steel parts of a uniform. A number of small automobiles, sirens shrieking, materialized suddenly with glaring headlights in the gloom of the corridor, following the rats in a mad pace.

Three of the cars stopped, a hundred yards farther down, men in metal armor, face plates down, manipulated tanks and spray nozzles, while the rest of the cars followed the rats, overtook them, wallowing through their bodies, and brought their spray nozzles into action from the other side. The air of the tunnel became heavy with acrid, brown poison vapors, the lights shining with dull, amber glare through the mist.

The headlights of an oncoming electric train fought feebly through the brown fog. The train stopped. It was covered with blood and the mangled bodies of rats. An officer alighted from the first car and stood in his blood-spattered uniform before the company commander. He saluted and called though the filter of his gas protection: "Is this Combat Company B 1427? Transport train 6721, commander Laval, two minutes late, due to rats."

The two drivers of the train, armed with spades, were scraping the bodies from the windshield of their car, while Burke signed the necessary papers. The men were distributed on the six cars of the train. The officers and the guide boarded at last, taking seats behind the windshield of the first car, the motors hummed, and with vicious acceleration the train lunged forward.

But only after minutes signals forced the drivers to slow down. The tunnel was strewn with debris, and then daylight fell through an opening thirty feet across in the ceiling of the passage. The train came to a stop. The tunnel was filled with men, clad in the same grey diver's suits, but marked as engineering troops by a red spoked wheel on the sleeve. Their officers had amplifying devices attached to their helmets, and their commands boomed against the low ceiling of the cavern.

A huge man, bearing the insignia of a captain on his overalls, approached the train. "Captain Grigorivitch of the F 342 Engineers," he bellowed through the loud-speaker. "You have to wait a few minutes, until we get the tracks clear. They busted the ceiling with a 27-inch howitzer projectile. Made a hole for the damn rats."

Outside was the howling roar of a falling projectile. A vicious explosion shook the ground.

"Overshooting now," the giant bellowed. "Lose their bearings. They must have sneaked in a tele-observer, when they scored the hit, they followed up with a nice selection. Got a hundred men killed, before we put up a wave barrage and put their tele- out of commission."

OUTSIDE was again the howl and the explosion of a projectile.

"Come on men, with those rails, this will be a hot place for the weeks to come. They'll keep on pounding, just for luck."

The tracks were clear, the train moved.

Behind it a tremendous explosion tore the concrete roof from the tunnel, twisting iron rails like wire, hurtling earth, concrete and men into the air. A recruit in the last car slumped forward, a splinter tore a hole as large as a fist in his back. The enemy artillery had scored another hit on the vulnerable spot, that they had found.

"Well, that's that," the transport officer yelled in his helmet, "almost derailed this cart. Give her the juice boys. Lively day, they must have got wind that we are relieving. You fellows will have a lot of fun at the tunnel terminals."

The train shot ahead. The men steadied themselves on their seats, clenching the holding rails in their fists.

Signal lights on the tunnel walls said "Gas free, face plates up." The men breathed hard, choked by a draft, that bit the faces. The train moved like a bullet, lurching around gradual bends of the road.

"Have to make up for lost time. That business with the rats was bad. Derailed a train a couple of weeks ago. They found only the bones of the crew. Dirty." The transport officer spat.

The train had traveled fifty miles under a dead city, that once had been the pride of humanity. Signal lights on the wall said "Slow" and finally "Stop." Ahead a switch yard was packed with trains.

A traffic officer approached the transport. "You have to get off here. The last five miles to the tunnel terminals are closed. They have found the terminals by tele-observation this afternoon and have maintained a barrage since. You can't get through. Where are you going?"

Young unfolded a map. "Here, square 31.43, 13.46. Combat positions LM 413 B."

The traffic officer looked into the face of the corporal. "Didn't you stop here this morning? Well, it looks bad, where you are going. No reports from the first lines. Farther back exceptional activity.

"Company commander, better have your men eat. Here is your ticket. Got a casualty? Dead? All right, leave him in the train. We take care of it.

"Follow the orange line, Corporal, to depot Hellgate. After eating, the green line to exit 357 D. Well, good luck."

"Good hell." Young used a salute, that had become customary among the front troops.

Depot Hellgate was a huge, gloomy cavern. Massive concrete pillars held the low ceiling, from which pale mercury lights shone through a foggy atmosphere, heavy with the vapor of broth and coffee. On long, rough tables hordes of cockroaches fed on the remains of hurried meals. About half of the seats were occupied by soldiers in full equipment. Kitbags on their shoulders, rifles between their knees, they gulped thick soup and steaming coffee.

"Eat boys, damn you, eat," Sergeant Blake shouted. "Lotsa meat in it, none of this synthetic stuff."

The men, used to the thin fare of the recruiting depots, ate heavily. Young and Burke, as experienced front soldiers, ate slowly, deliberately, timing their movements like men who don't expect to eat again for a long time.

In fifteen minutes the company was on its way again, following a green line painted on the walls of a tortuous tunnel. Honeycombed on either side were the bunks of traffic and intelligence troops.

Rows of heavy curtains, wet and sticky from some kind of impregnation, closed the tunnel. A sign said: "Exit 300 feet ahead. Gas alert."

Single file, Young and Burke leading, Sergeant Blake closing, the company emerged into the dusk outside. Behind them the contorted ruins of huge towers loomed into the night sky. Dark shadows flitted across the path, the whistling of rats broke the dead silence. Single projectiles traveled with a soft howl through the air, exploded in the city with a muffled thud.

A dark shadow flitted overhead, there was a soft swish in the air. "Torpedo," Young's warning cry came none too soon. The air torpedo, gliding down almost noiselessly, hit one of the city towers. There was a glaring flash of flame, an awful, tearing detonation, and debris and splinters rained down over square miles. The men pressed their bodies to the ground close to crumbling walls, while the missiles, torn loose by the torpedo, kept on whistling and clattering down among them. Two of the recruits were hit and killed instantly. Their bodies had to be left behind.

On went the men, hurrying, panting for breath, struggling over debris and shell holes, sweating in their heavy overalls.

Finally Young slowed down the pace. "It is always dangerous near the tunnel exits," he explained. "We are in Sunnyside Suburb now. We are comparatively safe here, they know, there are not many targets left. Do you remember, John, six years ago the first bombs fell here. I remember it like it had been yesterday. A woman on the Industry Tower cried that they had killed her children in their little beds. It was when they killed mother and Anne."

"We wanted to take vengeance then. Have we done it?"

"We have killed. Whom?"

The suburban street was still discernible. It was lined with the ruins of cottages. In an orchard a tree stood in full bloom, shining through the dusk with phosphorescent beauty. Young thought of happy children, that might have played around it. Again the soft swish of a torpedo, passing close, was overheard. The recruits were learning, they were down before the warning cry. But only a muffled thud and a big gasping sigh followed the passing of the machine.

"Gas!" The face plates clanged shut. But when the company resumed its march, five of the men did not move. Two struggled to their feet, stumbled on with paralyzed limbs and then suddenly dropped and lay still.

The captain carried a small case containing a gas detector on his breast. When the luminous glow on the view plate disappeared, command was given, "Face plates up."

The ruins, lining the road, thinned out. The country became open and level, a sterile desert marred by innumerable shell craters, crisscrossed by the tracks of tanks and artillery tractors. Peculiar, crumbling furrows and tunnels gaped where mole tanks had wallowed in the ground.

CHAPTER VIII

A Reunion

THE company struggled on through the treacherous terrain of deserted battle fields. Swarms of screaming long-range projectiles passed overhead, bursting on the Sunnyside Road behind them. Low, flat steel cupolas were to the left, electric long-range batteries that were handled from tunnels way underground.

A honeycomb system of crumbling trenches opened. Here and there the stench of decay stood thick and nauseating in the air. In some places the face plates had to be closed because gas lingered over the ground. There were other units of combat troops beside the company, more and more, all struggling forward in the same direction. Outside tractors, transport tanks and mobile artillery crawled on, climbing through craters and over trenches.

Converging traffic jammed the passages ahead. Young looked at his watch. "We have plenty of time," he said to the captain. "We can make a thirty minutes rest. How does your leg feel?"

"All right, Fred. I hold out longer than those kids."

The company rested in a huge, fresh shell crater.

Burke laughed. "They have been throwing around here with nasty stuff, Fred."

Young did not laugh. The last three years at the front had taken all the laughing matter out of shell holes for him. "It's those 27-inch howitzers," he said. "They must have a lot of them. It is getting worse and worse. They did plenty to the tunnels lately with that heavy stuff."

One of the men, a boy of sixteen, edged closer. He had overheard the last words and said to the corporal: "It

couldn't be worse up there than in the ammunition factories, where they took me from. Twelve hours work, not enough to eat and them blisters from CBX gas. In two weeks six of my gang croaked."

The corporal looked at him and said simply: "No," thinking to himself: "Poor kid." Looking southward over the crater rim he saw the horizon flickering with continuous muzzle flashes. Sometimes a ruddy glare sprang up, enveloping large portions of the sky. A continuous, grinding, rumbling noise rocked the atmosphere.

He turned to the captain, who was on his back, looking up to the murky sky. "Did you meet any girls back there in the camp, John?"

Burke did not move. "I did. But it is all different now. It seems that all was buried with Anne. I think it was one of the reasons why I volunteered back to the regiment. I don't belong back there anymore."

The boy of sixteen had been looking over the crater rim into the trench. "Lot of men going up. How come nobody coming back?" he asked with painful bravado.

"Going another way," Young lied to him. "Are they moving again?"

"Yes, sir."

Burke got up. "Guess we better get going."

The company resumed the march. Between the trenches were ammunition dumps, piles and rows of projectiles, covered with tar paper and loose soil. Tractors were loading and unloading. Tons and tons of steel, explosive and poison had to be moved during the night. Day would see the ammunition dumps a desolated stretch of battle field between deserted trench systems. All work was done in the dark and almost noiselessly, the dreaded tele-observation machines of the enemy probably hovering in the dark sky.

A traffic officer halted the company at a trench crossing. "Tunnel entrance five hundred feet ahead. Follow the white ribbon. The entrances merge a thousand feet inside. Take an ammunition train, there is one going every five minutes tonight."

The tunnel entrance was closed by a series of impregnated curtains. The inside was lit electrically. Unlike the passage under the city it was composed of galvanized steel segments, that, standardized and manufactured in enormous quantities, had become an indispensable aid to modern warfare. If the ground was not solid rock, usually a mole tank* was employed to do the tunneling.

Specially trained crews removed the loose soil and fortified the resulting cavity with the arched steel segments. If the ground was not too tough, three hundred feet of tunnel could be driven in one night, the most serious problem being the disposal of the excavated earth. To mislead the observation of the enemy, the soil had to be deposited miles away from the tunnel entrances at places where the fire of the enemy artillery would do least harm.

The branch, taken by the company led down into the earth at a steep grade, to terminate eventually in a central hall deep under the surface of the earth. About a dozen exits merged here, some of them being provided with chutes and elevators for ammunition and supplies. Two parallel lines, joined every two hundred yards by cross galleries, led to the other tunnel terminal twenty miles away, situated under the third or rear combat position.

*A tank with whirling blades at the front, capable of removing great quantities of earth from its path.

In either tunnel line a track was provided, each serving the traffic in one direction. The battery-driven, electric flat cars of the older four-wheel type filled the tunnel almost entirely, leaving only a narrow catwalk for one man at the inner side. In the two central halls of the terminals the trains, emerging from one line, were loaded or unloaded and let around to the other line for the return trip. Tunnels of this type were leading to most sectors of the front, if the ground was not solid rock or swamp. In these cases the approach to the combat lines took a tremendous toll of life and material.

THE cars of a train, parked on the bend in the central hall were loaded. The men boarded the platforms between ammunition boxes, a siren shrieked, and the train was swallowed by the dark maw of the right tunnel.

There was no light in the tunnel save a faint illumination coming from the headlight of the first car and refracted from the galvanized tunnel walls. The train moved with moderate speed taking about an hour for the trip to the other terminal.

The central hall under the third combat position was an exact duplicate of the hall under the dump, but there were a number of lateral tunnels branching off to different combat units. Young took a tunnel that continued at its present low level for several hundred feet. The company passed a heavy steel door marked "Main Power PD 629" and guarded by half a dozen heavily armed men. The power-stations were the backbone of the most dangerous mechanical fighting units. When two years ago spies of the enemy had succeeded in blasting a large central plant, the results had been disastrous, and only lack of reconnaissance had prevented the enemy to strike a deciding blow.

Behind the steel door was the drone of thousands of motors. It had been found advantageous to manufacture the power engines as standardized, comparatively small units of 800 kilowatts each, a compact high speed gas turbine being coupled to an electric generator. Each of the larger power plants had 4000 of these units, each unit having an individual fuel reservoir on which it could run for a week after the supply was cut off. The fuel reservoirs were fed by several subterranean pipelines from pumping stations far behind the front

From the door of the power plant the tunnel sloped upward to terminate in a small central hall from which a number of rising passages branched off, each marked with the insignia and number of a combat unit. The effect of modern, mechanized warfare had decentralized not only mills and factories behind the front but also the fighting machinery in the lines The small combat points, from which concealed humans brought their awful machines into action, were now scattered irregularly, cleverly using vantage points from which the terrain between in a moment could be changed into a raging Inferno. And the first front lines, where the armies took contact, were contorted, ever changing, only held by the backbone of the positions farther back, and often in their present location not even known to the engaged generals.

Entering one of the narrow galleries, leading upward, Young said to the captain: "You don't know how small the world is, John. The other day, when I went to our regiment's staff, passing a torpedo station, I heard a familiar voice. It was old man Sikorsky of Irontown Col-

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THE ETERNAL WORLD

By **Clark Ashton Smith**

(Illustration by Paul)

It descended upon the head of one of the geometric images. The figure was dragged upward as by an herculean effort and vanished . . .

THE ETERNAL WORLD

By the Author of "The City of Singing Flame," "An Adventure in Futurity," etc.

CHRISTOPHER CHANDON went to his laboratory window for a last look at the mountain solitude about him, which, in all likelihood, he would never see again. With no faltering of his determination, and yet not wholly without regret, he stared at the rugged gully beneath, where the Gothic shade of firs and hemlocks was threaded by the brawling silver of a tiny stream. He saw the granite-sheeted slope beyond, and the two nearer peaks of the Sierras, whose slaty azure was tipped by the first autumn snow; and saw the pass between them that lay in a line with his apparent route through the time-space continuum.

Then he turned to the strange apparatus whose completion had cost him so many years of toil and experiment. On a raised platform in the center of the room, there stood a large cylinder, not without resemblance to a diving-bell. Its base and lower walls were of metal, its upper half was made wholly of indestructible glass.

A hammock, inclined at an angle of forty degrees, was slung between its sides. In this hammock, Chandon meant to lash himself securely, to insure as much protection as would be feasible against the unknown velocities of his proposed flight. Gazing through the clear glass, he could watch with comfort whatever visual phenomena the journey might offer.

The cylinder had been set directly in front of an enormous disk, ten feet in diameter, with a hundred perforations in its silvery surface. Behind it were ranged a series of dynamos, designed for the development of an obscure power, which, for want of a better name, Chandon had called the negative *time-force*. This power he had isolated with infinite labors from the positive energy of time, that fourth-dimensional gravity which causes and controls the rotation of events.

The negative power, amplified a thousand-fold by the dynamos, would remove to an incalculable distance in contemporary time and space anything that stood in its path. It would not permit of travel into the past or future, but would cause an instant projection *across* the temporal stream that enfolds the entire cosmos in its endless, equal flowing.

CLARK ASHTON SMITH

IN this story Mr. Smith reaches a new peak of achievement for his painting of the mysteries and strange possibilities of scientific events. We do not remember reading anything that approaches the vivid imagination of this story, or its bizarre series of adventures met by an explorer into the unknown.

We can only realize how puny is the human race, how infinitesimal our control over science, when we follow Mr. Smith's picturing of the "timeless" race. And the revolt of the timeless ones, with the catastrophe that follows it, is a masterpiece of thrilling and breath-taking description.

In the infinity of possible worlds, it is quite within reason that some such states of existence that Mr. Smith describes should really exist. And within the lifetime of the human race, if all goes well, we should one day come to know and experience them.

Unfortunately, Chandon had not been able to construct a mobile machine, in which he could travel, as in a rocket-ship, and perhaps return as to his starting-point. He must plunge boldly and forever into the unknown. But he had furnished the cylinder with an oxygen apparatus, with electric light and heat, and a month's supply of food and water. Even if his flight should end in empty space, or in some world whose conditions would render human survival impossible, he would at least live long enough to make a thorough observation of his surroundings.

He had a theory, however, that his journey would not terminate in the midst of mere ether; that the cosmic bodies were nuclei of the time-gravity, and that the weakening of the propulsive force would permit the cylinder to be drawn to one of them.

The hazards of his venture were past foreseeing; but he preferred them to the safe, monotonous certitudes of earthly life. He had always chafed beneath a feeling of limitation, had longed only for the unexplored vastnesses. He could not brook the thought of any horizons, other than those which have never been overpassed.

With a strange thrilling in his heart, he turned from the alpine landscape and proceeded to lock himself in the cylinder. He had installed a timing device, which would automatically start the dynamos at a given hour.

Lying in the hammock beneath leather straps that he had buckled about his waist, ankles and shoulders, he still had a minute or so to wait before the turning on of the power. In those moments, for the first time, there swept upon him in an unleashed flood the full terror and peril of his experiment; and he was almost tempted to unbind himself and leave the cylinder before it was too late. He had all the sensations of one who is about to be blown from a cannon's mouth.

Suspended in a weird silence, from which all sound had been excluded by the air-tight walls, he resigned himself to the unknown, with many conflicting surmises as to what would occur. He might or might not survive the passage through unfamiliar dimensions, at speed to which the velocity of light would be laggard. But if he did sur-

vive, he might reach the farthest galaxies in a mere flash.

His fears and surmises were terminated by something that came with the suddenness of sleep—or death. Everything seemed to dissolve and vanish in a bright flare; and then there passed before him a swarming, broken panorama, a babel of impressions, ineffably various and multiplied. It seemed to him that he possessed a thousand eyes with which to apprehend in one instant the flowing of many æons, the passing of countless worlds.

The cylinder seemed no longer to exist; and he did not appear to be moving. But all the systems of time were going by him, and he caught the scraps and fragments of a million scenes: objects, faces, forms, angles and colors which he recalled later as one recalls the deliriously amplified and distorted visions of certain drugs.

HE saw the giant evergreen forests of lichen, the continents of Brobdingnagian grasses, in planets remoter than the systems of Hercules. Before him there passed, like an architectural pageant, the mile-high cities that wear the sumptuous aerial motley of rose and emerald and Tyrian, wrought by the tangent beams of triple suns. He beheld unnameable things in spheres unlisted by astronomers. There crowded upon him the awful and limitless evolutionary range of transtellar life, the cyclorama of teeming morphologies.

It seemed as if the barriers of his brain had been extended to include the whole of the cosmic flux; that his thought, like the web of some mammoth and divine arachnidan, had woven itself from world to world, from galaxy to galaxy, above the dread gulfs of the infinite continuum.

Then, with the same suddenness that had marked its beginning, the vision came to an end and was replaced by something of a totally different character.

It was only afterwards that Chandon could figure out what had occurred, and divine the nature and laws of the new environment into which he had been projected. At the time (if one can use a word so inaccurate as time) he was wholly incapable of anything but a single contemplative visual impression—the strange world upon which he looked through the clear wall of the cylinder: a world that might have been the dream of some geometrician mad with infinity.

It was like some planetary glacier, fretted into shapes of ordered grotesquery, filled with a white, unglittering light, and obeying the laws of other perspectives than those of our own world. The distances on which he gazed were literally interminable; there was no horizon; and yet nothing seemed to dwindle in size or definitude, whatever its remoteness. Part of the impression received by Chandon was that this world arched back upon itself, like the interior surface of a hollow sphere; that the pale vistas returned overhead after they had vanished from his view.

Nearer to him than any other object in the scene, and preserving the same relative distance as in his laboratory, he perceived a large circular section of rough planking—that portion of the laboratory wall which had lain in the path of the negative beam. It hung motionless in air, as if suspended by a field of invisible ice.

The foreground beyond the planking was thronged by innumerable rows of objects that were suggestive both of statues and of crystalloid formations. Wan as marble or alabaster, each of them presented a mélange of simple curves and symmetric angles, which somehow seemed to include the latency of almost endless geometrical development. They were gigantic, with a rudimentary division into head, limbs and body, as if they were living things. Behind them, at indefinite distances, were other forms that might have been the blind buds or frozen blossoms of unknown vegetable growths.

Chandon had no sense of the passing of time as he peered from the cylinder. He could remember nothing, could imagine nothing. He was unaware of his body, or the hammock in which he lay, except as a half-seen image on the rim of vision.

Somehow, in that strange, frozen impression, he felt the inert dynamism of the forms about him: the silent thunder, the unlaunched lightnings, as of cataleptic gods; the atom-folded heat and flame, as of unlit suns. Inscrutably they brooded before him, as they had done from all eternity and would continue to do forever. In this world, there could be no change, no event: all things must preserve the same aspect and the same attitude.

As he realized later, his attempt to change his own position in the time stream had led to an unforeseen result. He had projected himself *beyond time* into some further cosmos where the very ether, perhaps, was a nonconductor of the time-force, and in which, therefore, the phenomena of temporal sequence were impossible.

The sheer velocity of his flight had lodged him on the verge of this eternity, like some Arctic explorer caught in everlasting ice. There, obedient to the laws of timelessness, he seemed fated to remain. Life, as we know the term, was impossible for him; and yet—since death would involve a time-sequence, it was equally impossible for him to die. He must maintain the position in which he had landed, must hold the breath he had been breathing at the moment of his impact against the eternal. He was fixed in a catalepsy of the senses; in a bright Nirvana of contemplation.

It would seem, according to all logic, that there was no escape from his predicament. However, I must now relate the strangest thing of all; the thing that was seemingly unaccountable; that defied the proven laws of the timeless sphere.

Into the glacial field of Chandon's vision, athwart the horizonless ranks of immutable figures, there came an intruding object; a thing that drifted as if through æons; that grew upon the scene with the slowness of some millennial coral reef in a crystal sea.

Even from its first appearance, the object was plainly alien to the scene; was obviously, like Chandon's cylinder and the wall section, of non-eternal origin. It was black and unlustrous, with more than the blackness of intrastellar space or of metals locked from light in the core of planets. It forced itself upon the sight with ultramaterial solidity; and yet it seemed to refuse the crystal daylight, to insulate itself from the never-varying splendor.

The Strange Captor

THE thing disclosed itself as a sharp and widening wedge, driven upon the adamantine ether, and forming, by the same violent act of irruption, a new visual image in Chandon's paralytic eyes. In defiance of the

mental laws of his surroundings, it caused him to form an idea of duration and movement.

Seen in its entirety, the thing was a large, spindle-shaped vessel, dwarfing Chandon's cylinder like an ocean liner beside a ship's dinghy. It floated aloof and separate—a seamless mass of unbroken ebon, swelling to an orb-like equator, and dwindling to a point at each end. The form was such as might have been calculated to pierce some obdurate medium.

The substance of which it had been wrought, and its motive power, were destined to remain unknown to Chandon. Perhaps it was driven by some tremendous concentration of the time-force with which he had played so ignorantly and ineptly.

The intruding vessel, wholly stationary, hung now above the rows of statuesque entities that were foremost in his field of vision. By infinite gradations, a huge circular door seemed to open in its bottom; and from the opening there issued a crane-like arm, of the same black material as the vessel. The arm ended in numerous pendent bars, that somehow gave the idea of finger-like suppleness.

It descended upon the head of one of the strange geometric images; and the myriad bars, bending and stretching with slow but limitless fluidity, wrapped themselves like a net of chains about the crystalloid body. Then the figure was dragged upward as if with herculean effort, and vanished at length, together with the shortening arm, in the vessel's interior.

Again the arm emerged, to repeat the bizarre, impossible abduction, and draw another of the enigmatic things from its everlasting station. And once more the arm descended, and a third entity was taken, like the theft of still another marble god from its marble heaven.

All this was done in profound silence—the immeasurable slowness of motion being muffled by the ether, and creating nothing that Chandon's ear could apprehend as sound.

After the third disappearance with its strong prey, the arm returned, extending itself diagonally and to greater length than before, till the black fingers barred the glass of Chandon's cylinder and closed upon it with their irresistible clutch.

He was scarcely aware of any movement; but it seemed to him that the ranks of white figures, the unhorizoned and never-dwindling vistas, were sinking slowly from his ken, like a foundering world. He saw the ebon bulk of the great vessel, toward which he was drawn by the shortening arm, till it filled his entire vision. Then the cylinder was lifted into the night-black opening, where it seemed that light was powerless to follow.

Chandon could see nothing; he was aware of nothing but solid darkness, enfolding the cylinder even as it had been enfolded by the white, achromatic light of timelessness. He felt about him the sense of long, tremendous vibration; a soundless pulsing that seemed to spread in circles from some dynamic center; to pass over and beyond him through æons, as if from some Titanic heart whose beats defied the environing eternity.

Simultaneously, he realized that his own heart was beating again, with the same protraction as this unknown pulse; that he drew breath and exhaled it in obedience to the cyclical vibration. In his benumbed brain, there grew the nascent idea of wonder; the first beginning of a natural thought-sequence. His body and mind were beginning to function once more, beneath the influence of the power that had been strong enough to intrude upon the timeless universe and pluck him from that petrifying ether.

The vibration began to swiften, spreading outward in mighty ripples. It became audible as a cyclopean pounding; and Chandon somehow conceived the idea of giant-built machinery, turning and throbbing in an underworld prison. The vessel seemed to be forging onward with resistless power through some material barrier. Doubtless it was wrenching itself free from the eternal dimension, was tearing its way back into time.

The blackness had persisted for awhile, like a positive radiation rather than the mere absence of light. Now it cleared away and was replaced by an all-revealing, ruddy illumination. At the same time, the loud, engine-like vibration died to a muted throbbing. Perhaps the darkness had been in some manner associated with the full development of the strange force that had enabled the vessel to move and function in that ultra-temporal medium. With the return into time, and the diminishment of power, it had vanished.

The faculties of thought, feeling, cognition and movement, under their normal time-aspects, all came back to Chandon like the loosing of a dammed-up flood. He was able to correlate all that occurred to him, and infer in some measure the meaning of his unique experience. With growing awe and astonishment, he studied the scene that was visible from his position in the hammock.

The cylinder, with the weird, crystalloid figures looming near at hand, was reposing in a huge room, probably the main hold of the vessel. The interior of this room was curved like a sphere; and all about and above, gigantic, unfamiliar machineries were disposed. Not far away, he saw the retracted crane or arm. It seemed that the force of gravitation inhered everywhere in the vessel's inner surface; for certain peculiar beings passed before Chandon as he watched, and ran upward on the walls till they hung inverted from the ceiling with the nonchalance of flies.

There were perhaps a dozen of these beings within sight. No one with earthly biologic prepossessions could even have imagined them very readily. Each of them possessed a roughly globular body with the upper hemisphere swelling mid-way between pole and equator to form two neckless, conical heads. The lower hemisphere terminated in many limbs and appendages, some of which were used for walking and others solely for prehension.

The heads were featureless, but a glittering, web-like membrane hung between them, trembling continually. Certain of the nether appendages, waving like inquisitive tentacles, were tipped with organs that may have served for eyes, ears, nostrils and mouths.

These creatures shone with a silvery light and appeared to be almost translucent. In the center of the pointed heads, a spot of coal-bright crimson glowed and faded with pulse-like regularity; and the spherical bodies darkened and lightened as if with the rhythmic interchange of rib-like zones of shadow beneath their surfaces. Chandon felt that they were formed of some non-protoplasmic substance, perhaps a mineral that had organized itself into living cells. Their movements were very quick and dexterous, with an inhuman poise; and they seemed able to perform many different motions with perfect simultaneity.

The Timeless World

THE earth-man was stricken to renewed immobility by the strangeness of it all. With vain, fantastical surmises, he sought to fathom the mystery. Who were these creatures, and what had been their purpose in penetrating the eternal dimension? Why had they removed certain of its inhabitants, together with himself? Whither was the vessel bound? Was it returning, somewhere in time and space, to the planetary world from which it had set forth on its weird voyage?

He could be sure of nothing; but he knew that he had fallen into the hands of super-scientific beings, who were expert navigators of space-time. They had been able to build a vessel such as he had merely dreamt of building; and perhaps they had explored and charted all the unknown deeps, and had deliberately planned their incursion into the frozen world beyond.

If they had not come to rescue him, he would never have escaped from the doom of timelessness, into which he had been hurled by his own clumsy effort to cross the secular stream.

Pondering, he turned to the giant things that were his companions. He could scarcely recognize them in the red glow: their pallid planes and angles seemed to have undergone a subtle rearrangement; and the light quivered upon them in bloody lusters, conferring an odd warmth, a suggestion of awaking life. More than ever, they gave the impression of latent power, of frozen dynamism.

Then, suddenly, he saw an unmistakable movement from one of the statue-like entities, and realized that the thing had begun to alter its shape! The cold, marble substance seemed to flow like quicksilver. The rudimentary head assumed a stern, many-featured form, such as might belong to the demi-god of some foreign world. The limbs lightened, and new members of indeterminate use were put forth. The simple curves and angles multiplied themselves with mysterious complexity. A diamond-shaped eye, glowing with blue fire, appeared in the face and was quickly followed by other eyes. The thing seemed to be undergoing, in a few moments, the entire process of some long-suspended evolution.

Chandon saw that the other figures were displaying singular alterations; though in each case the ensuing development was wholly individual. The geometric facets began to swell like opening buds, and flowed into lines of celestial beauty and grandeur. The boreal pallor was suffused with unearthly iridescence, with opal tones that raced and trembled in ever-living patterns, in belted arabesques, in rainbow hieroglyphs.

The human watcher felt the insurgence of a measureless *élan*, of a super-stellar intellection, in these remarkable beings. A thrill of terror, electric, eerie, ran through him. The process he had just seen was too incalculable, too tremendous. Who, or what, could limit and control the unsealed activities of these Eternal Ones, aroused from their slumber? Surely he was in the presence of beings akin to gods, to the demons or genii of myth. That which he beheld was like the opening of the sea-recovered jars of Solomon.

He saw that the marvelous transformation had also been perceived by the owners of the vessel. These creatures, thronging from all parts of the spheroid interior, began to crowd around the timeless entities. Their mechanical, darting motions, the lifting and levelling of certain members that ended in eye-shaped organs, betrayed an unhuman excitement and curiosity. They seemed to be inspecting the transfigured forms with the air of learned biologists who had been prepared for such an event and were gratified by its consummation.

The Timeless Ones, it appeared, were also curious regarding their captors. Their flaming eyes returned the stare of the periscopic tentacles, and certain odd horn-shaped appendages of their lofty crowns began to quiver inquisitively, as if with the reception of unknown sense-impressions. Then, suddenly, each of the three put forth a single, jointless arm, emitting in mid-air seven long, fan-like rays of purple light in lieu of a hand.

These rays, no doubt, were capable of receiving and conveying tactile impressions. Slowly and deliberately, like groping fingers, they reached out, and each of the fans, curving fluctuantly where it encountered a rounded surface, began to play with a rhythmic flaring about the foremost of the double-headed creatures.

These beings, as if in alarm or discomfort, drew back and sought to elude the searching rays. The purple fingers lengthened, encircled them, held them helpless, ran about them in broadening, clinging zones, as if to explore their whole anatomy. From the two heads to the disk-like pads that served them for feet, the beings were swarthed around with flowing rings and ribbons of light.

Others of the vessel's crew, beyond reach of the curious beams, had darted back to a more secure distance. One of them lifted certain of his members in a swift, emphatic gesture. As far as Chandon could see, the being had not touched any of the vessel's machinery. But as if in obedience to the gesture, a huge, round, mirror-like mechanism overhead began to revolve in its frame on massive pivots.

The mechanism appeared to be made of some pale, lucid substance, neither glass nor metal. Ceasing its rotation, as if the desired focus had been secured, the lens emitted a beam of hueless light, which somehow reminded Chandon of the chill, frozen radiance of the eternal world. This beam, falling on the timeless entities, was plainly repressive in its effect.

Immediately the finger-like rays relinquished their quarry, and faded back to the jointless arms, which were then retracted. The eyes closed like hidden jewels, the opal patterns grew cold and dull, and the strange, half-divine beings appeared to lose their complex angles, to regain their former quiescence, like devolving crystals. Yet, somehow, they were still alive, they still retained the nascent lines of their preternatural efflorescence.

IN his awe and wonder before this miraculous tableau, Chandon had automatically freed himself from the leather bands, had risen from the hammock, and was standing with his face pressed against the wall of the cylinder. His change of position was noted by the vessel's crew, and their eye-tentacles were all raised and levelled upon him for a moment, following the devolution of The Timeless Ones.

Then, in response to another enigmatic gesture from one of their number, the giant lens rotated a little further, and the glacial beam began to shift and widen, till it played upon the cylinder though still including in its hueless range the dynamic figures.

The earth-man had the sensation of being caught in a

motionless flood of something that was inexpressibly thick and viscid. His body seemed to congeal, his thoughts crawled with painful slowness through some obstructing medium that had permeated his very brain. It was not the complete arrest of all the life-processes that had been entailed by his impingement upon eternity. Rather, it was a deceleration of these processes; a subjection to some unthinkably retarded rhythm of time-movement and sequence.

Whole years seemed to intervene betwixt the beats of Chandon's heart. The crooking of his little finger would have required lustrums. Through tediously elongated time, his brain strove to form a single thought: the suspicion that his captors had been alarmed by his change of posture, and had apprehended some troublous demonstration of power from him, as from the Timeless Ones.

Then, through further decades, he conceived another thought: that he himself was perhaps regarded as one of the god-like beings by these alien time-voyagers. They had found him in eternity, amid the measureless ranks; and how were they to know that he, like themselves, had come orginally from a temporal world.

With his altered sense of duration, the earth-man could form no proper conception of the length of the voyage in time-space. To him, it was almost another eternity, punctuated at lustrum-long intervals by the humming vibration of the machinery. To his delayed visual perception, the crew of the vessel seemed to move with incredible sluggishness, by imperceptible gradations. He, with his weird companions, had been set apart by the chill beam in a prison of slow time, while the ship itself was plunging through fathomless dimensions of secular and cosmic infinitude!

At last the voyage came to an end. Chandon felt the gradual dawning of an all-pervasive light that drowned the vessel's ruddy glow in fierce whiteness. By infinite degrees, the walls became perfectly transparent, together with the machinery, and he realized that the light was coming from a world without. Immense images, multiform and intricate, began to crowd with the slowness of creation itself upon the glaring splendor. Then—doubtless to permit the removal of the guarded captives—the retarding ray was switched off, and Chandon recovered his normal powers of cognition and movement.

He beheld an awesome vision through the clear wall, whose transparence was perhaps due to the complete turning-off of the vessel's motive-power. He saw that the vessel was reposing in a diamond-shaped area, surrounded with architectural piles whose very magnitude imposed itself like an irremovable weight upon his senses.

Far up, in a fiery orange sky, he saw the looming of bulbous Atlantean pillars with platform capitals; the thronging of strange cruciform towers; he viewed with amazement the eerie wonder of unnatural cupolas that were like inverted pyramids. He saw the spiral pinnacles that seemed to support an unbelievable burden of terraces; the slanting walls, like fluted mountain-scarps, that formed the base of imagineless cumuli. All were wrought of some shining, night-black stone, like a marble quarried from an ultra-cosmic Erebus. They interposed their heavy, lowering, malignant masses between Chandon and the flames of a hidden sun that was incomparably more brilliant than our own.

Blinded by the glare and dizzied by those lofty piles; aware also of queer heaviness in all his bodily sensations, doubtless due to an increased gravity, the earth-man turned his attention to the foreground. The diamond area, he now saw, was thronged with people similar to the crew of the time-vessel. Like giant, silvery, globular-bodied insects, they came hurrying from all directions on the dark pavement. Arranged in a ring about the vessel, were colossal mounted mirrors, of the same type that had emitted the retarding ray. The gathering people stopped at some little distance, leaving a clear space between the ray-machines and the ship, as if for the landing of the crew and captives.

Now, as if in response to some hidden mechanism, a huge, circular door was opened in the seamless wall. The folded crane began to lengthen, and covered one of the timeless beings with its mesh of tentacles. Then the mysterious entity, still quiet and unresisting, was lifted through the aperture and deposited on the pavement outside.

The arm returned, and repeated this procedure with the second figure, which, in the meanwhile, had apparently realized the cessation of the retarding beam, and was less submissive than its fellow had been. It offered a rather tentative resistance, and began to swell as the tentacles enfolded it, and to put forth pseudopodic members and finger-like rays that plucked gently at the tightening mesh. However, in a few moments, the second being had joined its companion in the world without.

The Revolt of the Timeless Ones

AT the same time, a startling change had begun to manifest itself in the third figure. Chandon felt as if he were present at the epiphany of some æon-veiled and secluded god, revealing himself in his true likeness from the molten chrysalis of matter. The transformation that occurred was as if some chill stalagmite should burgeon forth in a thousand-featured shape of cloud and fire. In one apocalyptic moment, the thing seemed to expand, to rush upward, to change its entire substance, to develop organs and attributes such as could belong only to a super-material stage of evolution. Æons of star-life, of world-life, of the slow alchemy of atoms, were abridged in that instant.

Chandon could form no clear conception of what was happening. The metamorphosis was too far beyond the normal interpretative range of human senses. He saw something that towered before him, filling the vessel to its roof and pressing terribly against the curved transparent surface. Then, with inestimable violence, the entire vessel broke in a thousand flying, glittering, glass-like fragments, that shrieked with the high, thin note of tortured things as they hurtled and fell in all directions.

Before the last fragments had fallen, the time-cylinder was caught and drawn upward from the wreck as if by some mighty hand. Whether the looming giant had reached down with one of its non-human members, or whether the cylinder had been lifted by magnetic force, was never wholly clear to Chandon. All he could remember afterwards was the light, aerial soaring, in which he experienced a sudden and complete relief from the heavy gravitation of that unknown planet.

He seemed to float very swiftly to an elevation hard to estimate, from the absence of familiar scale; and then the cylinder came to rest on the cloud-like shoulder of the

Timeless One, and clung there as securely as if it had landed on the shore of some far-off, separate world, aloof in space.

He was beyond awe or surprise or bewilderment. As if in some cataclysmic dream, he resigned himself to the unfolding of the swift miracle. He peered out from his airy vantage, and saw above him, like the topmost crag of a lofty cumulus, with stormy suns for eyes, the head of the being who had shattered the alien time-vessel and had risen above its ruins like a loosed and rebellious genie.

Far down, he beheld the black diamond area that swarmed with the silvery people. Then, from the pavement, there rushed heavenward, like the pillared fumes of a monstrous explosion, the mounting and waxing forms of the other Timeless Ones. Tumultuous, awful, cyclonic, they rose beside the first, to complete that rebel trinity. Yet, vast and tall as they had grown, the pylons around them were taller; the terrace-bearing pinnacles, the topsy-turvy pyramids, the cruciform towers, still frowned upon them from the glowing, coal-bright air like the dark, colossal guardians of a trans-galactic hell.

Chandon was aware of a thousand impressions. He felt the divine and limitless energies, waked from eternal sleep, that were flowering with such dynamic violence in time. And he felt, warring with these, endeavoring to subdue and constrain them, the jarring radiations and malignly concentered powers of the new world. The very light was inimical and tyrannous in its fiery beating; the blackness of the lowering domes and peristyles was like the crushing fall of a thousand muted maces, swung by sullen, cruel, silent Anakim. The lens-machines on the pavement, revolving, glared upward like the eyes of boreal Cyclops, and turned their frosted beams on the cloudy giants. At intervals, the sky lightened with a white-hot flaring, like the reflex of a million remote furnaces; and Chandon was aware of surly, infra-bass, reverberant, bell-toned clangors, of drum-notes loud as beaten worlds, that impinged upon him from all quarters of the throbbing air.

The environing piles appeared to darken, as if they had gathered to themselves a more evil and positive ebon, and were raying it forth to stupefy the senses. But beyond this, beyond all physical perceptions, Chandon felt the black magnetism that surged in never-ceasing waves; that clamored before the barriers of his will, that sought to usurp his mind, to wrest and shape his very thoughts into forms of monstrous thralldom.

Wordless, and conveyed in thronging images of terrible strangeness, he caught the biddings of unhuman bane, of transtellary hatred. The very stones of the massive buildings were joined with the brains of that exotic people in an effort to resume control of Chandon and the three Timeless Ones!

DARKLY, the earth-man understood. He must not only submit to the silvery beings, he must do their will in all things. He and his companions had been brought from eternity for a purpose—to aid their captors in some stupendous war with a rival people of the same world. Even as mankind employs in warfare explosives of Titanic potency, the silver creatures had desired to employ the time-loosed energies of the Eternal Ones against their otherwise equally matched foes! They had known the route through secret dimensions from time into timelessness. With well-nigh demoniac audacity, they had planned and executed the weird abduction; and they had assumed that Chandon was one of the eternal entities, with latencies of immense *élan* and god-like power.

The waves of evil monition rose ever higher. Chandon felt himself inundated, swamped. With televisic clearness, there grew in his mind a picture of the foe against whom he was being adjured to go forth. He saw the glaring perspectives of remote, unearthly lands, the mightily swarming piles of unhuman cities, lying beneath an incandescent sun that was vaster than Antares. For a moment, he felt himself hating these lands and cities with the cold, imagineless rancor of an otherworld psychology.

Then, as if he had been lifted above it by the giant upon whose shoulder he rode, Chandon knew that the black sea was no longer beating upon him. He was free from the clutching mesmerism, he could no longer conceive the alien emotions and pictures that had invaded his mind. Miraculous ease and sublime security enveloped him; he was the center of a sphere of resistant and resilient force, which nothing could subdue or penetrate.

Sitting as if on a mountain throne, he saw that the demiurgic triad, contemptuous and defiant of the pygmies beneath, had resumed their magic growth and were shooting upward to attain and surpass the level of the topmost piles. A moment more, and he peered across the Babelian tiers of sullen stone, crowded with the silver people, and saw the outer avenues of a mammoth metropolis; and beyond these, the far-flung horizons of the unnamed planet.

He seemed to know the thoughts of the Timeless Ones as they looked forth on this world whose impious people had dreamt to enslave their illimitable essence. He knew that they saw and comprehended it all in a glance. He felt them pause in momentary curiosity; and felt the swift, relentless anger, the irrevocable decision, that followed.

Then, very tentatively and deliberately, as if they were testing their untried powers, the three beings began to destroy the city. From the head of Chandon's white, supernal bearer, there issued a circle of ruby flame, to detach itself, to spin and broaden in a great wheel as it slanted down and settled on one of the higher piles. Beneath that burning crown, the unnatural-angled domes and inverse pyramids began to quiver, and seemed to expand like a dark vapor. They lost their solid outlines, they tightened, they took on the patterns of shaken sand, they shuddered skyward in rhythmic circles of somber, deathly iris, paling and vanishing upon the intolerable glare.

From the Timeless Ones, there emanated the visible and invisible agencies of annihilation; slowly at first, and then with cyclonic acceleration, as if their anger were mounting or they were becoming more engrossed in the awful and godlike game.

From out their celestial bodies, as from high crags, there leaped living rivers and raging cataracts of energy; there descended bolts, orbs, ellipsoid wheels of white or vari-colored fire, to fall on the doomed city like a rain of ravening meteors. The builded cumuli dissolved into molten slag, the columns and piled terraces passed in driven wraiths of steam, under the burning tempest. The city ran in swift torrents of lava; it quivered away in spirals of spectral dust; it rose in black flames, in sullen auroras.

Over its ruins, there moved the Eternal Ones, clearing for themselves an instant way. Behind them, in the black

and clean-swept levels whereon they had trodden, foci of dissolution appeared, and the very soil and stone dissolved in ever-spinning, widening vortices, that ate the surface of the planet and bored down upon its core. As if they had taken into their own substance the molecules and electrons of all that they had destroyed, the Eternal Ones grew ever taller and vaster.

Chandon beheld it all from his fantastic aerie with supernal remoteness and detachment. In a moving zone of inviolate peace, he saw the fiery rain that consumed the ultra-galactic Sodom; he saw the belts of devastation that ran and radiated, broadening ever, to the four quarters; he peered from an ever-loftier height upon vast horizons, that fled as in reeling terror before the timeless giants.

Faster and faster played the lethal orbs and beams. They spawned in mid-air, they gave birth to countless others. They were sown abroad like the dragon's teeth of fable, to follow the longitudes of the great planet to its poles. The stricken city was soon left behind, and the giants marched on monstrous seas and deserts, on broad plains and high mountain-walls, where other cities shone far down like littered pebbles.

There were tides of atomic fire that went before to wash down the prodigious alps. There were vengeful, flying globes that turned the seas into instant vapor, that smote the deserts to molten, stormy oceans. There were arcs, circles, quadrilaterals of annihilation, growing always, that sank downward through the basic stone.

THE fire-bright noon was muffled with chaotic murk. A bloody Cyclops, a red Laocoön, battling with serpent-coils of cloud and shadow, the mighty sun seemed to stagger in mid-heaven, to rush dizzily to and fro as the world reeled beneath that intolerable trampling of macrocosmic Titans. The lands below were veiled by mephitic fumes, riven momentarily to disclose the heaving and foundering continents.

Now to that stupendous chaos the very elements of the doomed world were adding their unleashed energies. Clouds that were black Himalayas with realm-wide lightning, followed behind the destroyers. The ground crumbled to release the central fires in volcanic geysers, in skyward-flowing cataracts. The seas ebbed, revealing dismal peaks and long-submerged ruins, as they roared in their nether channels to be sucked down through earthquake-riven beds to feed the boiling cauldrons of internal disruption

The air went mad with thunders as of Typhon breaking forth from his underworld dungeon; with roaring as of spire-tongued fires in the red pits of a crumbling inferno; with moaning and whining as of djinns trapped by the fall of mountains in some unscalable abyss; with howling as of frantic demons, loosed from primordial tombs.

Above the tumult, higher and higher, Chandon was borne, till he looked down from the calm altitude of ether; till he gazed from a sun-like vantage upon the seething and shattered orb, and saw the huge sun itself from an equal height in space. The cataclysmic moan, the mad thunder, seemed to die away. The seas of catastrophic ruin eddied like a shallow backwash about the feet of the Timeless Ones. The furious, all-devouring maelstroms were no more than some ephemeral puff of dust, stirred by the casual step of a passer-by.

Then, beneath him, there was no longer the nebulous wrack of a world. The being upon whose shoulder he still clung, like an atom to some planetary parapet, was striding through cosmic emptiness; and spurned by its departure, the ruinous ball was flung abyssward after the receding sun around which it had revolved with all its vanished enigmas of alien life and civilization.

Dimly the earth-man saw the inconceivable vastness to which the Eternal Ones had attained. He beheld their glimmering outlines, the vague masses of their forms, with stars behind them, seen as through the luminous veil of comets. He was perched on a nebular thing, huge as the orbit of systems, and moving with more than the velocity of light, that strode through unnamed galaxies, through never-charted dimensions of space and time. He felt the immeasurable eddying of ether, he saw the labyrinthine swirling of stars, that formed and faded and were replaced by the fleeing patterns of other stellar mazes. In sublime security, in his sphere of dream-like ease and motion, Chandon was borne on without knowing why or whither; and, like the participant of some prodigious dream, he did not even ask himself such questions as these.

After infinities of flying light, of whirling and falling emptiness; after the transit of many skies, of unnumbered systems, there came to him the sense of a sudden pause. For one moment, from the still gulf, he gazed on a tiny sun with its entourage of nine planets, and wondered vaguely if the sun were some familiar astronomic body.

Then, with ineffable lightness and velocity, it seemed to him that he was falling toward one of the nearer worlds. The blurred and broadening mass of its seas and continents surged up to meet him; he seemed to descend, meteor-like, on a region of rough mountains sharp with snowy pinnacles that rose above somber spires of pine.

There, as if he had been deposited by some all-mighty hand, the cylinder came to rest; and Chandon peered out with the eerie startlement of an awakened dreamer, to see around him the walls of his own Sierran laboratory! The Timeless Ones, omniscient, by some benignant whim, had returned him to his own station in time and space; and then had gone on, perhaps to the conquest of other universes; perhaps to find again the white, eternal world of their origin and to fold themselves anew in the pale Nirvana of immutable contemplation.

THE END

COMING!

"THE BROOD OF HELIOS"

WAVES OF COMPULSION

By **Raymond Gallun**

(*Illustration by Paul*)

As soon as Mac entered the glowing aura of the cone, his feet left solid ground and he shot slantingly upward.

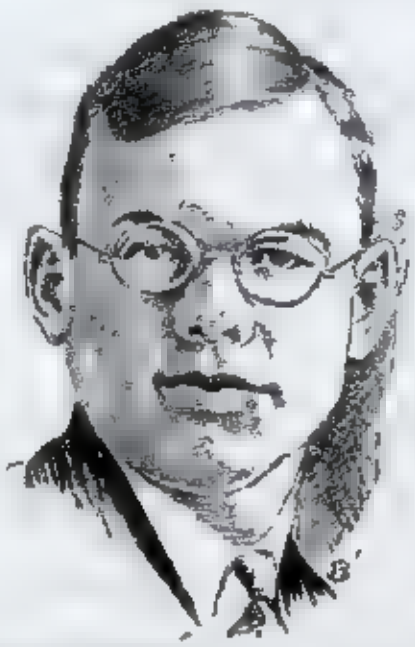
WAVES OF OF COMPULSION

By the author of "The Revolt of the Star Men," "The Space Dwellers," etc., etc.

MERTON SANDHURST was in a mood for relaxation. He had put in a stiff three days of work with scarcely twice as many hours of sleep and now he felt that he deserved a good rest. The tentative check-up on the newly discovered propelling ray was complete; he knew its wavelength, its qualities, and he had a rather well-defined idea of what it might be used for.

Tomorrow he would start work on a real, practical projector; maybe he would even do a little planning for the spaceboat—wonderful thought, that—an inspiration for many other thrilling thoughts of adventures in the void which was still untouched by men. But tonight Sandhurst didn't care to bother about such things. He wanted to take it easy now and snooze!

Languidly he shuffled down a corridor in the great subterranean laboratory of which he had recently been made master, and entered the small room which, of his own free will, he had chosen to inhabit. Like most of his subordinates he believed that it was best for a man to remain close to his work.



RAYMOND GALLUN

Carelessly he sat down in a big easy-chair and propped one foot up on the edge of the bed. There was something suggestively feline in the lazy movement. Sandhurst was a strong man, and though he had passed well into middle life, time and the demands of his strenuous vocation had left few tell-tale marks on his rugged constitution.

His eyes roved from the battered, impassively staring visage of the Egyptian statuette of the Fourth Dynasty standing on top of the book case, to the rows of gilt-lettered titles of the volumes in the shelves below. There was little of science here: Kipling's "Barrack Room Ballads," Poe's short stories, Shakespeare's complete works. The savant sensed an austere, aloof elegance about those books, and something peaceful and far-removed from the hustling, busy world.

Merton Sandhurst lighted a cigarette. Suddenly it came to him how completely cut off from the world he was in his laboratory. It was five hundred feet below ground and was shielded on all sides by an immense wall of lead alloy. No radio waves, not even the all-pervading cosmic rays could penetrate here. If they could, they would have spoiled the incredibly delicate experiments being performed with obscure etheric vibrations. Even the air here was specially purified to remove any traces of radioactivity it may have acquired in the upper atmosphere. A catastrophe might occur in the world above, but in this buried realm of science there would be no sign.

Sandhurst had thrown aside his soiled smock, was kicking off his shoes, and then the telephone rang. With a lazy gesture he raised the receiver to his ear.

"Murgatroyd Laboratory, Sandhurst speaking," he drawled.

It was a long-distance call from Flagstaff.

The voice that presently came over the wire had a tense excited quality that gave the experimenter's languid mood a sharp jolt. Sandhurst recognized the voice of his friend, John Borden, the astronomer:

"Busy, Mert?"

"Better than that. I'm going to turn in in about a minute."

"No you're not—not when you hear what I've got to say! The bolide we've been watching—things happened just as I predicted. The earth captured it!"

"So? Tell me about it," Sandhurst said, affecting a disinterest which he no longer felt.

"It has become our moon and is revolving in an orbit just beyond the limits of the atmosphere," Borden continued. "It has been visible here for just a few minutes and I haven't been able to measure its speed yet, but it certainly makes a complete circuit of its orbit much faster than the earth rotates on its axis. Consequently, like the inner moon of Mars, it rises in the west and sets in the east. It's altogether very, very strange.

"The object is about a quarter of a mile in diameter and of roughly oval shape. Its surface is covered with a smooth surface that shines like splinters of volcanic glass—kind of purplish and wicked—sort of gives you the creeps. And there is something there that I would like

WE are all aware of the strange mass or mob psychology that causes thousands of people in a group to be seized with identical impulses so that they act as one person. This control over the minds of thousands would be a power supreme to anyone who could exercise it.

Since people in a mass are responsive to mob psychology, there is no reason why such mental control or waves of compulsion could not be exercised over them. Some students of the subject believe that waves could be broadcast, such as we send our radio waves, that would strike the brains of people and compel them to do things they would not do ordinarily.

We do know that in a feeble way, mental telepathy is possible today. But to extend the power and range of this telepathy so that waves of compulsion could be broadcast would require scientific knowledge far beyond us at the moment. The future, however, should show great advances along this line, and as our author pictures in this strange, exciting tale, it should produce great changes in all human life.

to know more about. It is hemispherical and—and—oh—"

Sandhurst heard a gasp from Borden followed by a tinkling sound. Immediately the telephone went dead. The light in his room blinked off, burned again for a second, and then died out completely, leaving the scientist in absolute darkness.

"What the devil!"

Sandhurst groped to the door and opened it. He heard the sudden throb and hum of the engine-driven emergency generator coming from a near-by room. The normal illumination was restored.

The scientist made his way to a large vaulted chamber which housed four huge tanks of glass filled with a dark fluid. Beside them a man was impatiently trying to get some response from a telephone switchboard which persistently refused to show any signs of life.

He turned at the sound of Sandhurst's footsteps. His beefy countenance, which commonly expressed perfect Scotch-American good nature, was twisted into an angry grimace.

"THE nit-wits!" he stormed. "They promised us perfectly even power for six days, and now, before three of 'em are up every line into this laboratory turns stone-cold. Our experiment is a wreck and even the blasted phone has gone haywire so I can't even call 'em up and bawl 'em out! What are we going to do, Mert?"

The man surveyed his superior's face for a moment. He saw that the usual care-free smile was gone; the chin was set and hard, and it seemed that he could detect a slight pallor creeping through the faint bronze of his cheeks.

"Mert— What's the matter?"

"Nothing serious, I hope, Mac," Sandhurst replied. "Awaken the men and conduct a general check-over. Possibly the trouble is right here in the laboratory—fuse or something. I'm going above for a minute and take a look at the weather."

Merton Sandhurst did not care to spread a false alarm, yet it was with serious misgivings that he entered an elevator and sent it racing toward the upper levels of the Murgatroyd Electromagnetic Laboratory. He knew that it was ridiculous to suppose that all the power lines could quit at once as a result of any ordinary mishap. It was considered phenomenal if the current in them varied even slightly. Only the sudden stopping of the machinery in the power station could account for the present occurence. And the telephone— How was it possible for that to go dead too, at the same time? Coincidence? No, that appeared to be completely beyond belief.

Sandhurst felt that in the ether about, vague and none too beneficent forces were at work, and somehow he associated the purple meteor with those forces. It seemed an intangible and unreasoning idea, yet Borden's brief and excited communication about the celestial visitor, terminated by a gasp and then silence, kept drumming in his mind and hinting at the unknowable.

The elevator jolted to a stop at the lower level of the squat cylindrical building which surmounted the laboratory. This building was also heavily shielded against all external etheric vibrations. Sandhurst hurried to a small circular window which looked westward. The glass pane that closed it was very thick, and effectively screened out all known ether waves with the exception of those within the limits of the visible spectrum.

Beyond it he could see a broad stretch of typical Mississippi Valley country, the details of which were only very dimly hinted at by the starlight that sifted through thin, shadowy clouds. There was a narrow ribbon of concrete roadway that wound up past the laboratory, and beside it dark patches which he knew were cornfields. A little to the north was a group of farm buildings, and close beside them the sooty smear of a woods. The lights of the near-by town of Ishbel should have lit up a small segment of the sky, but now there was no sign of their existence.

Sandhurst had stared out of the window for only a moment when he became aware of a purplish, fiery something that surged up rapidly through a thick cloud bank hanging straight to the west. It edged the cloud with a fringe of milky opalescence that grew wider and brightened. Then a dazzling chunk of darkling, scintillating purple light thrust itself up into the clear air above the translucent vapor, and began its rapid march among the stars. It was the visiting meteor.

Sandhurst examined it minutely. In apparent size it was somewhat less than half as big as the moon. It was curiously regular in form and, as Borden had said, it seemed to be coated with crystals of a glassy, quartz-like material. Indeed the scientist felt, with a tingling thrill, that its twinkling, shifting rays resembled the frosty sparks that come from a jewel of evil reputation.

Someone was hammering loudly on the heavy metal door which was located a few paces farther down the wall. Oddly Sandhurst did not ask who the person was who sought admittance to the laboratory. Perhaps it was because he had stood for a few seconds in the light of the meteor.

Half puzzled, he felt himself move toward the door, felt his hands lift the bar that latched it. The metal panel swung inward and a gust of cool night air blew against his face, rousing him a little from his semi-dazed condition. There was a man out there. He was big and burly and was clad in a greasy pair of overalls.

At Sandhurst's appearance he lowered his head and charged straight for the scientist. Sandhurst was neither a weakling nor a coward, but somehow a strange numbness had taken possession of his limbs, making him awkward and clumsy. The two grappled and fell in a heap just inside the threshold. Sandhurst caught only a brief glimpse of the man's blank, grease-smeared face and his lifeless, staring eyes. Then a dozen or more like him swarmed in through the door and dragged the scientist out into the open.

Immediately a tingling paralysis, which robbed him of all voluntary motion came over him. His captors released their grip on his arms and he sprawled on the turf like a loose-jointed rag doll.

The pack of greasy begrimed men hurried back into the laboratory. Sandhurst's head was turned toward the doorway, and so he could see them moving about in the lighted interior. They worked with utmost haste like rescuers in a burning building. The reason for this was not yet apparent to the savant. Nor was it clear to him what they were looking for. There were various kinds of chemical and electrical supplies stored in the upper rooms of the laboratory, but nothing else.

SANDHURST was quite sure that he knew what was about to happen. The hubbub would attract the attention of the men below. They would come up in the elevators and, discovering his predicament, they would try to rescue him. The spell and the strange numbness that had trapped him would fall upon them too. If he could only somehow warn them! First he tried to raise himself up on an elbow, but his effort was entirely without success. His limbs seemed completely dead and immovable. Then he attempted to yell, but his lips did not move and no sound came from his throat.

One of the elevator motors hummed; the gate of the cage jangled open. There were sounds of hurrying feet inside the laboratory; an exclamation of surprise from a man, followed by a sharp command:

"Back up, you bums! Get out o' my way! Tell me what you did with the Chief before I make myself darned poisonous to you!"

McLennan! Good old Mac! But he was headed straight for inevitable misfortune. Sandhurst heard noises which meant a violent scuffle—the thud of several sharp blows, Mac's certainly; back at school he had been a notorious scrapper.

He was talking to his opponents again, and by now it seemed that his anger really was mounting: "So you won't clear out, eh?" Though he could not see what was transpiring within the laboratory, Sandhurst could guess how those insensate creatures were acting; they knew no fear, would give no quarter unless the mysterious entity that guided them gave the command.

There was a flurry of pistol shots, and a moment later the intruders retreated from the laboratory; once outside, they paused and stood looking back. One crumpled to the ground.

Sandhurst saw McLennan's burly form against the lighted doorway, saw his face in the shifting purple glow of the meteor. Mac looked about and located the sprawling body of his chief on the wet grass not twelve paces from him.

"Mert—! My God—! What—!"

Sandhurst would willingly have given his life at that moment if he could only have given a little gesture of warning, but as far as his own mind was concerned, his body was as rigid as if it had been frozen in ice. And now Mac was falling under the same spell. Sandhurst could see his look of concern change to one of puzzlement and then to alarmed comprehension. Presently he too would be sprawling there on the ground unable to move.

No, Mac was turning toward the door—working his way laboriously toward the sheltering interior. One foot ahead of the other—slowly, painfully as though a viscid fluid, waist-deep, impeded his progress. The muscles stood out on his hard-set jaws and beads of sweat glinted on his forehead under the rays of the meteor. The madmen stood back unhindering.

Mac was faltering. There was a scurry of footsteps inside the laboratory. "Give me a hand Jim!" Mac gasped.

Jim Townsend, chief chemist, reached out and grasped the fortunate Scot by the belt and jerked him to safety.

Merton Sandhurst detected a weird life in his paralyzed limbs; they were behaving independent of any orders coming from his brain. Now he was rising to his feet and now he was racing off in the company of the other night prowlers, in the direction of the road which led to Ishbel. A purple globe, glowing like the meteor itself, danced high in the air ahead of him.

What was going to happen now? What was it all about, anyway?

In a vague sort of way Sandhurst was beginning to comprehend.

Over his shoulder he heard McLennan shouting: "I've got an idea, Chief, and we're coming after you. Watch for us. So long, Chief!"

Sandhurst wanted desperately to look back and give some sign that he had understood these reassuring words.

However, though his body was beyond his control, his mind remained as clear and active as ever. He saw the men who loped along beside him. Their faces were all blank and set, and ghastly in the weird light; yet he sensed that behind those frozen masks were other imprisoned minds as eager as his own for freedom.

He could not look up at the meteor, still he could tell by the shrunken shadow that bobbed along beneath his feet that it had already reached zenith in its hurried flight across the sky. There, he knew was hidden the secret of his strange paralysis. An emanation of some kind was coming from the glittering visitor, had snapped the connection between his brain and his body and perhaps was even now directing his and his companions' flight toward Ishbel.

Such a supposition made imperative the admission that there was an intelligent agent acting somewhere; and intelligence meant life. Still, that appeared to be out of the question. He was quite sure that a world only a quarter of a mile in diameter could not harbor living creatures. Its gravity would be so ridiculously weak that any atmosphere or water on its surface would float away in an instant.

Was it possible that the meteor was a space ship built by an alien race? No, that was unlikely; although a space vessel would have the visitor's regular form. Try as he might, Sandhurst could find no sensible solution to the problem.

He watched the phosphorescent globe that flickered and wavered back and forth several hundred yards ahead of him, and high up in the air. Always it retreated at just the rate that he and his companions moved, apparently guiding them like a purposeful will-o'-the-wisp, along the road to Ishbel.

CHAPTER II

The Attack from the Air

A large truck rumbled up from the rear and came to a stop. Mechanically, without knowing why they did it, the men clambered into its dusty gravel box. Sandhurst caught a brief glimpse of the driver. He too was obviously under some external influence. Behind the first of the van other automobiles straggled, their headlights slanting yellowly through the faint haze of the roadway. These vehicles doubtless all carried men flocking toward Ishbel for a purpose, the nature of which they themselves were quite unable to guess.

Sandhurst was crouching in the rear of the truck's crowded box. Opposite him, directly behind the cab,

were two people who had evidently been passengers before his party had boarded. The lights of the vehicles behind flickered and danced on their faces. Both were very young, somewhere between eighteen and twenty, he judged.

The scientist gave a gasp when he saw that one of them was a girl, and the stark cruelty of the unknown enemy that held them in thrall jolted into full realization within his mind. In spite of her disheveled condition, and the vacuous look of dumb horror in her face, she was strikingly beautiful. Her wavy black hair, unrestrained by any head-covering, blew about her cheeks, which were unnaturally pallid now, even through the faint rose of make-up which she had tastefully put on. She wore a light blue dress, and on her bosom gleamed a speck of gold which Sandhurst surmised was a sorority pin. She had no coat, and her white arms trembled visibly, partly because of fright and partly because the night air of early Autumn was chilly.

Her companion too was recognizable as a student, probably belonging to the University, which was situated only seven miles east of Ishbel. Sandhurst felt that somewhere he had seen him before. He too had dark wavy hair, and in his thin ascetic face his prominent eyes gleamed with a strange eager, determined light which immediately attracted the scientist's attention. They were staring at Sandhurst with an insistent, dumb plea in them which for a moment almost unnerved the savant.

He saw the muscles suddenly tighten over the narrow jaws and the shadows flicker in the thin cheeks. Then, wonder of wonders, the youth spoke!

The words were few and gaspingly uttered: "Mr. Sandhurst—I know you— For Fay's sake—help. Cant—" He stopped and slumped back against the cab, panting as though spent by some tremendous effort.

His act was a revelation to the scientist. The meteor ray, if such it be, was not unconquerable! Determination, strong will, perhaps practice, could surmount it if only in a limited way.

He had recognized the young college man. He was Vance Pierre, pianist, and scholarship student at the University. Several times Sandhurst had seen his picture in the papers, and once he had heard him play—only once, for Vance scorned the radio, but it was a thing to remember for life

Sandhurst was sure that it was the fine intellectual powers of the young artist that was the determining factor in his momentary escape from the controlling influence of the meteor. Perhaps his love for the girl, who was apparently his sweetheart, had helped too.

He wanted desperately to reassure these two young people, and to allay their fears if he could, although he knew that the calamity that had fallen upon mankind was in all probability world-wide, following the path of the meteor.

"The spell will pass soon," he wanted to say. Fiercely he tried to force the words to his unwilling tongue, fighting until beads of moisture stood out on his forehead. Yet he only succeeded in making his lips move slightly, incoherently, in a way that conveyed no meaning.

Still he would not give up. If Pierre could escape even slightly, perhaps he, by constant trying and practicing, could win a limited freedom from the compulsion ray.

Sandhurst was so engrossed in the intense labor of making his muscles and vocal cords respond to his will that they had come well within the limits of Ishbel before he was conscious of it. The street lights were burning now, for the controlling entity had evidently decreed that the distant generators should be started.

The purple meteor had dipped below the horizon; yet its influence persisted, for in its wake across the heavens it left a fiery train that flickered and shifted like an aurora borealis.

Ishbel was a filthy little city where iron was mined and smelted. Its streets were lined with rows of spindly box-elder saplings, behind which crouched shabby dwelling houses, each a duplicate of the others. At the edge of the town, opposite the point where the truck on which Sandhurst was a passenger, entered, towering rows of blast furnaces reared, and about their bases squatted, amid heaps of slag, the buildings of brick and corrugated iron, that housed the auxiliary equipment.

The city was thronged with people. Miners and their wives and children, farmers collected from the surrounding country, well-dressed business men, a few students; folks from almost every walk of life were represented.

The concourse was the most orderly that Sandhurst had ever seen. There was no shouting, no laughter, not a single unnecessary gesture. Everyone walked in orderly columns, but their slow, measured steps, and their blank faces spoiled the effect, making it horrible.

IN the midst of the van of other vehicles, the truck proceeded across the town. It paused beside a barren area of level ground not far beyond the mine shafts and the smelting furnaces.

The place was certainly acres in extent. At regular intervals around its rim, oily bonfires gave illumination, lighting up dimly the thousands of human figures that had already collected there. In the air above, a score or so of purple, luminescent globes similar to the one that had led the van of cars along the road to Ishbel, wheeled and zigzagged restlessly through the smoke of the fires.

Mechanically, incapable of resisting some order given them by the controlling entity, the occupants of the truck clambered to the ground and joined a long line of others who moved with slow lock-step toward the center of the lighted area.

Sandhurst hoped that he would not be separated from Vance Pierre and the girl for he already felt a fatherly affection for the two young people.

Yes, perhaps he was going to be lucky. Fay was directly ahead of him in the line, and Vance behind

The column passed a pile of shovels, and, as each came abreast of it he selected one and carried it with him. Fay's turn came, and she followed the example of the others, just as did all of the women who were scattered indiscriminately along the line.

Some minutes later Sandhurst and his two youthful companions were feverishly at work digging at the center of the open area. About them was a vast throng of slaves similarly employed, and their numbers rapidly increased as the hordes of unwilling recruits from the surrounding country poured into Ishbel. Already several steam shovels had gone into action to aid the human chattels. A light railway was being laid, over which to haul the loosened earth to the dumping place. Many motor trucks had been pressed into service for the same purpose.

AN hour passed. The purple meteor was again hurtling across the sky toward the east.

During that hour Sandhurst had labored as he never believed that a human being could labor. His muscles ached furiously, for though his motor nerves were out of control, his sensory nerves were as keen and active as ever. His lips were dry and his face burned with perspiration. Ragged blisters had formed themselves on the palms of his hands.

And, like his body, his mind was furiously active. So many novel and horrible impressions were coming to his brain, which seemed like an impotent intelligence sealed up in a block of crystal, that they blended and blurred into one vast, dominating impression which might be expressed by the single word—holocaust. He felt as a personal experience the thunder of truck motors being started; the scrape of heavy tires against loose earth; the thud of sledges; the rhythmic movements of thousands of tortured bodies in the ruddy light of the illuminating fires; the click of shovels; the mysterious luminous globes that wheeled overhead and, ruling everything, the purple meteor, making the earth an inferno or fairyland of moving light and shadow. Its soft bluish rays seemed like a symbol of cold, calm power.

It was not holocaust for that implied confusion. There was no confusion. Sandhurst realized that he was a tiny cog in an incredibly huge and efficient machine—the human race working against itself for some unknown purpose, and directed by a thing of which it knew nothing.

A furious tide of anger was rising within him. Robbed of all means of expressing it, he knew that unless he found some way to fight the controlling entity, there could be but one consequence for him—insanity. And he neither knew of a way to suppress his anger nor desired to do so.

He could hear the sobbing breathing of the girl close beside him. As he worked about the trucks which the controlling entity had commanded them to load, he had occasional glimpses of her. Fay's position might almost be humorous if it had not been so horrible. Her clothing was dirty and torn now, and her face was grimed with clay and perspiration. Sandhurst's own powerful body ached and burned as though it were afire. He could imagine then, how Fay felt.

Once more he tried mightily to break his bonds. Some sign of his effort must have been apparent, for he heard Vance Pierre's voice close to his ear:

"I'm winning, Mr. Sandhurst. Keep up the fight and you'll win too." The words were halting; nevertheless there was a hopeful encouraging ring in them.

Inch by inch, with almost infinite effort, Sandhurst began to win ground from the power that ruled him. First he sought to move his lips; succeeding slightly in this, he directed his attention to his fingers, and at length managed to move them too. He tried to direct his muscles in the process of digging; yes, he finally found that he could place the shovel where he chose, and could bear down on it when he chose. Though the controlling entity was a hard taskmaster, it was many times more difficult and tiring to resist than to obey. Sandhurst realized that anything like complete immunity from the "force" was probably totally out of the question.

BUT his mind was set on escaping and taking his young friends with him. He knew that the possibilities of doing so were cobweb-thin for fulfilment, yet it was always best to keep the idea of success in mind.

Seeking information concerning the nature of his enemies, he cast occasional glances toward the luminescent globes that wheeled unceasingly in the air above. Frequently one of them came quite close to the ground, and Sandhurst saw that they were two-foot spheres of a transparent, glass-like material. Within the hollow interiors always squatted a pinkish, ovoid thing about the size of a football. Slender tubular limbs, resembling the many-jointed appendages of spiders, projected from this central portion.

These, then, were the creatures who had usurped man's position as ruler of the earth. But whence came they? While realizing that the purple meteor was the important instrument in the conquest of the world, he still could not picture it as the abode of life.

And so, at last the tardy dawn began to creep up in the east, making everything look unreal and wraith-like in the ashy half-light. An occasional light puff of breeze blew against Sandhurst's perspiring body, causing him to shiver with cold. The bonfires which had given illumination through the night had died down to red embers which sent up thin pencilings of gray smoke. A freight train drawing many loaded flatcars came hooting into town, and stopped on a near-by siding. And still the slaves labored on.

The result of the night's work was an immense circular pit fully a thousand yards in diameter, and uniformly a little more than ten feet deep. Men were already coating the northern portion of the level floor with some whitish substance, probably a kind of cement. Around the rim of the huge excavation, webby girders of some silvery metal were rising, arcing up toward the sky. It appeared that when this strange structure or machine was finished, the girders would meet at an apex many hundreds of feet above ground, forming a vast cone of metal latticework.

Sandhurst saw that the hours of toil were already taking their toll from among the ranks of slaves. Here and there among the tortured humans that thronged the pit, dead bodies were carelessly being tossed into dirt trucks and into the cars of the light railway. Many of the workers, particularly the women and children, seemed on the point of dropping, but there were plenty of fresh recruits to take their places.

The scientist's suspicions were confirmed. The invaders had so many chattels that there was no need to bother about feeding them or giving them rest. It was simpler to force them to work until death came, and then to replace them.

Sandhurst had been watching his two companions. Vance Pierre, gifted with a resilient toughness belied by his frail appearance, had, like the savant himself, stood up fairly well, but the girl, he could see, had almost reached the limit of her endurance. She had won no freedom from the compulsion wave.

A fresh truck had just rolled into position beside them. From somewhere out of the graying eastern sky there came a low droning. Sandhurst and Pierre detected it almost simultaneously. For long moments between spasms of work they resisted the controlling entity to stare upward, searching for the source of the sound.

Presently they found it; a tiny speck that glinted goldenly far to the east, for at the lofty altitude at which it

rode, the sun was already shining. The speck was moving rapidly toward Ishbel, and after a few seconds it took on the lines of an airplane—not some fantastic creation of the invaders, but a machine such as earthmen were wont to fly.

Sandhurst's eyes widened with amazement when he saw that the wings and fuselage of the ship were gilded. He had seen only one plane so painted; it belonged to old Mac, his assistant, and had been kept at the laboratory. Could McLennan have found some way of shielding himself from the compulsion waves? Was he coming over to attempt to rescue his chief? The old fool! Yet, even though he sputtered inwardly, Sandhurst's heart quickened at the thought of the idea. Or was a slave of the invaders, perhaps Mac himself, controlling the plane? Sandhurst felt with a bitter twinge that this was more likely.

The ship continued to approach until it was directly overhead. There it circled and banked about appraisingly, as though whoever piloted it were interested, perhaps maliciously so, in the things that were going on down on the ground. It seemed to be acting a lot like Mac's crate after all.

Meanwhile the invaders in their flying globes were showing signs of uneasiness. They darted this way and that with increased rapidity like alarmed dragon-flies. Then, simultaneously, as though by some prearranged signal, all but one of them shot straight upward toward the airplane.

While the majority of the slaves were physically incapable of taking any notice of the impending air battle, Sandhurst always managed to keep his eyes turned toward the golden plane.

The pilot was not to be taken unawares. He dipped his craft sharply, and then from its nose there darted twin streams of lead that bored straight through the swarm of belligerent invaders. Four spheres burst with a peculiar plopping sound like the cracking of an electric light bulb, and their fragments, and the fragments of their occupants twisted and gyrated groundward.

It was Mac alright—no mistaking it now. He always was a scrapper. Sandhurst felt an impulse to cheer. But the doggoned old nit-wit ought to be more careful!

The invaders never wavered in their steady ascent, and all the way up, the machine guns of the plane kept peppering them; ripping them out of the sky.

CHAPTER III

The Juggernaut

LIKE a swift cloud of destruction the swarm of angry globes poured over the golden aircraft. Several flashes of incandescent fire, like bolts of lightning, darted in their midst, and flickered like flaming whip lashes against the fuselage and wings of the machine. A few pieces of torn fabric floated slowly downward.

The motor roared with a sudden gunning, and the plane went into an almost vertical power dive. For a moment Mac managed to free himself from his enemies; however, it was soon evident that their speed was superior to the best efforts of his ship. They caught up with him, and again jagged tongues of flame zigzagged through the craft's empennage.

With set jaw, Sandhurst watched it waver, and then go into a tail spin. Three short bursts chattered from the machine guns into the closely-packed invaders, who milled and gyrated all about. Evidently old Mac was still conscious and in the fight.

Several globes came too close to the whirling propeller of the craft, as it followed its crazy spiral course downward. The steel blade snarled angrily, and scattered glass and bits of chewed flesh.

For the first time the invaders hesitated, allowing their prey to pull clear of them. Doubtless they thought that McLennan was using some unheard-of weapon against them.

Promptly the plane righted itself, and made off toward the east in the direction of the laboratory. It was limping unsteadily, and the discordant sound of the motor and propeller told plainly that the blades had been warped and were vibrating badly.

Reassured by their enemy's weakened condition, the globe presently renewed the attack. This time they seemed determined to end the life of the presumptuous Earthman who dared to fight them. The last Sandhurst saw of his old friend's plane, it was spinning down rapidly toward a grove of trees about a mile and a half outside of Ishbel. He could not be sure that it was out of control, but he guessed that such was the case. Mac was lying in that woods, amid a tangle of wreckage, probably either dead or seriously injured. Sandhurst felt a peculiar tightening of his muscles. It was the natural preparation for acts which incurred great physical risk.

He glanced around toward his two companions. When he saw them his pulse throbbed with mingled pity and rage. The hot blood hissed and tingled to the tips of his blistered fingers, making them clutch and unclutch spasmodically. Worked to the limit of her endurance the girl had lost consciousness. Vance stood with his arm about her waist, supporting her.

Sandhurst was ready for action. Every moment of delay made the infinitesimal chance of escaping grow slimmer. To wait resignedly for death went against his grain; it was cowardly. Besides, Mac was out there.

The lone invader guard could not see Sandhurst, for he was hidden behind the truck. He gestured to Vance, waving toward the cab of the big vehicle.

"Come," he said. The real test of their ability to defy the compulsion waves had begun.

Picking up the unconscious girl, step by step they fought their way back to the truck. Tortured nerves lashed tortured muscles to sluggish action. The two men were winning, but no one could hope to stand up under such strain for long.

They climbed into the cab; Sandhurst slipped behind the wheel. The driver had deserted his post to help load. Clumsily the scientist turned on the ignition; his foot pawed unwillingly at the starter. The powerful motor caught immediately.

There was a clear roadway which led up a gently inclined ramp that rose to the edge of the pit. Sandhurst steered wobblingly along it. Luck was siding him with the shifting. The occupant of the globe above, was seemingly unaware of what was happening.

The truck had climbed out of the excavation now, and was gaining speed. Sandhurst was peering anxiously ahead, and he had ordered Vance to watch the rear. The

road they were traversing was rough and tortuous, winding in and out among vast heaps of earth.

Twice they narrowly escaped a crash, but after a few moments they were clear of the dumping grounds, and were zigzagging painfully but with dangerous speed, along a street which led east.

Sandhurst had noted the approximate location of the woods where McLennan's plane had fallen. It was close to the highway which led back toward the laboratory. If they could reach the plane—there was just a chance that it wasn't too badly damaged—

His thoughts were cut short by the appearance of a globe directly ahead. It must have been one of the party that had downed Mac—probably its pilot was an introspective individual who had felt the urge for a quiet jaunt all by himself, and had deserted his companions for a few minutes before returning to the vicinity of the pit.

BUT the creature was unmistakably interested in the erratic course of the truck! He flashed nearer, and hung close beside the cab. Both Sandhurst and the youth strove valiantly not to appear to notice his presence; yet, out of the corner of his eye, the scientist was watching the invader closely.

With a chilly, crawly feeling tightening his skin, he saw the monstrous thing's many-faceted eyes inspect him minutely, critically. Its long tubular mouth set deep in the fleshly folds of its ovoid body, twitched in a way that was reminiscent of one of the habits of an unpleasant old professor whom Sandhurst had known in his youth. A crazy idea to pop into one's head at such a time, he thought. The thing's spindly limbs were fumbling with a pair of tiny levers.

Was the creature going to bring the weapon that had been used against Mac, into play? No, a cool, scientific mind would not inflict death upon interesting subjects without first investigating the cause for their peculiar actions, he decided. Instinctively he sensed what was about to happen. Jabbing fiercely at the accelerator, he sent the big truck careening along at even greater speed.

Sandhurst had noted the pistol dangling in its holster just beneath the dashboard. Almost automatically it brought a brief sharp command to his lips:

"The gun, Vance—if necessary use it!"

The youth drew the heavy Colt and released the safety catch.

The sidewalks along the street they were traversing, were thronged with human slaves of the invaders. In response to some act on the part of the occupant of the globe, a full hundred of them rushed out in front of the truck waving their arms wildly and screaming like demons. What they meant to do was perfectly clear, and Sandhurst never hesitated. Now was no time to be ruled by squeamish qualms when the very existence of the human race was at stake. Though the thought that his act might cause the deaths of dozens of poor wretches, was repugnant to him, he urged the heavy vehicle to its topmost speed.

The group of slaves loomed closer, seemed literally to hurtle toward them. With a thudding vibration the crash came. The truck rocked, skidded; only its great weight kept it from turning over. Bodies were bashed and torn, and went under the heavy tires.

But there were no screams of agony, only discordant screeches more expressive of insane triumph. The faces of the stricken slaves remained as blank and expressionless as ever. Their cheeks whitened a trifle, that was all. And their demoniac persistence was appalling, horrible. With broken bloody fingers they clutched at the truck, its headlights, its fenders, anything they could grasp, seeking to bring it to a stop.

The truck was grinding its way deeper into the densely-packed mob. It had lost the force of its initial momentum and was slowing down. The crowd of slaves was thickening rapidly, reinforced by those who stood along the sidewalks.

Sandhurst clutched madly at the wheel, striving to hold the truck in the road, and to keep himself from being hurled through the windshield. These would have been hard things to do even under normal circumstances when he was in full possession of all his powers; but now the sight of blood and death, and the jangling, irrelevant shouts of the slaves, were unnerving him. He felt himself weakening; the compulsion waves were winning.

The truck swerved, and a crash with a car parked at the side of the street seemed unavoidable. The adventure would have ended then and there if Vance had not grasped the wheel and swung the heavy vehicle back into its proper course.

More slaves poured in ahead of them, choking the street and blocking the way with their mangled bodies. The racing wheels of the truck screeched ineffectually against the pavement. Men leaped to the running-boards and, mechanically, without feeling, Vance shot them down. Instinctively his arm tightened about the unconscious girl who had been placed between him and the scientist.

For the first time in perhaps twenty seconds they caught sight of the presiding genius of this gory inferno. The invading sphere dipped low, circling the cab, and its nightmare occupant seemed to chuckle and sneer at them in fiendish glee.

"Try to get the invader, Vance! Everything may depend on your aim!" Sandhurst cried.

Though he was inexperienced, and was tremendously handicapped by the compulsion waves which would certainly batter down his resistance in a short time, Pierre raised his gun and fired at the zigzagging, elusive enemy. Luck favored the youth, for the first bullet told. Amid a tinkling shower of broken glass from the sphere, the invader's mangled form tumbled, kicking and writhing among the closely packed forms of its slaves.

The results were immediate. No longer under the local influence of the invader who had caused them to attempt to capture the fugitives the slaves fell back to their original positions at the edge of the street, where they awaited the next command which the compulsion waves would give them.

The truck plowed over the mangled bodies of the dead and wounded and raced away toward Ishbel along the concrete highway which led in the direction of Murgatroyd Laboratory.

BUT it was impossible to expect that it would get far. Sandhurst had not hoped to reach the laboratory; he only sought to get to the woods where Mac's plane had fallen. There was a slim chance that Mac would be alive, and could help them.

The woods seemed tantalizingly near. The short side-road which turned north and led past it was barely a hun-

dred yards farther on. But Sandhurst realized now that they would never make it.

To add to their difficulties, they were being pursued. Sandhurst caught sight of a cluster of specks which he knew were invading globes. At the rate they were coming, it was not hard to guess that they would presently be darting down upon him and his companions with vengeance in their hearts.

It was the realization of pursuit that was the immediate cause of the next event. The attention of the two men was distracted from the task of guiding their vehicle. With a series of shattering jolts the truck left the highway, broke through a barbed-wire fence, rushed down a considerable slope, and plunged into a narrow and rapidly flowing river.

Though the truck was badly damaged and almost completely submerged, its occupants escaped without serious injury. The men crawled out of the flooded cab, carrying the limp form of the girl with them. The cold water momentarily refreshed them.

Sandhurst's eyes fell upon a small boat moored several yards from where he squatted on top of the cab. Simultaneously he remembered that Snake River ran through the woods where McLennan was! Climb aboard, draw in the anchor stone, and float down stream—simple. It was worth trying anyway.

Presently they were drifting with the current, under arching willow branches, and around a sharp bend.

Not long after they had passed out of sight the globes came to the scene of the accident. The invaders made a tentative inspection of the wreck, and then hurried back in the direction of Ishbel. Evidently they had decided that the fugitives were dead, or they had dropped the pursuit as too pointless to waste time upon.

However, the position of the occupants of the small boat was still far from pleasant. The compulsion waves had again all but conquered them. They could no longer move of their own free will; they could only lie in the bottom of their craft and clutch madly at its gunwales to prevent their muscles from obeying the mysterious commands that were coming to them—telling them to go back toward Ishbel.

And at last even that freedom was gone. Now they were in the depths of the woods. Wearily Sandhurst and Pierre guided their craft to the right bank of the river, and clambered ashore, leaving Fay behind.

They were walking back toward the road when a deep bass voice hallooed through the grove:

"Hey, Chief!"

It was Mac. Good old Scottie! Sandhurst turned about to face him; but his act had not been directed by his own will, nor was the attitude his body assumed, his own—a cat-like crouch with muscles tensed—that was the way to meet a deadly foe, not a friend.

Mac wore a queer kind of armor which covered him from head to foot. It was made of a fabric woven from fine wires of a dull grayish metal. Since only his eyes showed through the immense goggles of his fantastic hood, he was recognizable only by his voice, but this was unmistakable. Plainly it was the suit of shielding material that gave him his immunity from the compulsion waves.

Fifty yards away was the wreck of McLennan's plane which had pancaked through the tree-tops.

Sandhurst wanted to greet his assistant in a boisterous manner, but this he could no longer do; that crazy body of his was edging forward to attack.

McLennan never hesitated. He rushed his chief and sent a hard fist crashing into his jaw. The scientist, his vital forces already nearly drained, dropped unconscious to the ground. Vance was only a moment in following suit.

"Sorry, lads," Mac muttered, "I had to do it. You see, like most everybody else, you're a bit batty now."

He investigated the boat and found Fay. Then, one by one, he lugged the three of them up a slope, through a grove of scrub oaks, and into the entrance of a deserted iron mine which had not been worked for almost a century. The mine was a gallery which led straight into the heart of the hill. Mac chose a side passage in which to deposit his burdens. With materials from his first-aid kit, he disinfected and bandaged the raw blisters on their hands.

When his task was finished he sat down in the reddish dust of the floor and leaned back against the rough wall. A little light seeped in to him from the mine's entrance.

"They ought to get some sense back into their domes here," he reflected. "Not much of the waves can get into this hole. But I'll have to watch them or they may try to pull something funny yet."

In the world without, the sun had risen. High overhead the purple meteor hurtled. It was dimmer now, still the potent force of evil that emanated from it was undiminished. Just beyond the hill of the mine a silvery something streaked upward, leaving a train of incandescence behind it. It dwindled rapidly, became a tiny speck in the blue sky, and vanished.

CHAPTER IV

The Mystery of the Mine

McLENNAN waited until the even breathing of his charges told him that their unconsciousness had changed to normal slumber, then, wearied by days of constant experimentation and the strenuous events of the past few hours, and feeling perfectly secure in the buried mine, he too fell asleep.

It was some hours before McLennan awoke. He stared about, at first a bit puzzled by his unaccustomed surroundings. He saw the rusty brown walls, dim-lit, and the forms of his companions, still sleeping soundly. Everything was as it had been before, yet he had a vague, poorly defined idea that some unusual, perhaps sinister, occurrence had aroused him. What was it? He struggled to remember his impressions of that hazy moment of awakening. A flash of light? A moving shape? He could not be sure. Perhaps it would be best to investigate.

He hurried to the entrance of the mine. There was nothing in sight to confirm any suspicions he may have had—only the river with the late afternoon sun glinting goldenly on its ripples, and the shadows the dwarfed oak trees cast on the hillside. Satisfied that he had merely dreamed a vagrant dream brought on by a touch of nerves, Mac promptly dismissed from his mind, the illusive feeling that all was not well, and returned to his companions.

Sandhurst was standing up when he entered the side gallery. As Mac had expected, his superior was his old

self again. The few hours of sleep had refreshed him, and the compulsion ray, which could not penetrate here, had left no serious effects on his naturally healthy and rugged constitution.

He had recognized his surroundings immediately, for, as a boy he had often visited the old mine. As it was easy to guess what Mac had done, no explanation for his being there now was necessary.

Sandhurst grasped the hand of his friend for a hearty hand-shake. "Splendid work, old man," he said, "and a heap of thanks for the wallop!"

But the practical McLennan brushed the compliments aside. "You ain't bad yourself," he said dryly. "Let's hear where you got all those marks of heroism." Chuckling amusedly he indicated Sandhurst's bandaged hands.

Sandhurst recounted his adventures briefly; then it was Mac's turn. He had pushed back his hood of metal fabric.

"After you left us," he said, "I put the boys to work making this outfit I've got on. This morning I hauled out the old bus just to take a look around the country to see what's happening. Same everywhere. There ain't hardly any sane people left in the world since that meteor came last night. They're digging pits in Dunnfield and Elm Grove too. The one at Dunnfield ain't much more than half as big as the one at Ishbel, and the cone of girders is just about finished. I've been trying to figure out what those things are for.

"The boys were going to have some more of those wire overalls finished tonight, and I was going to sneak over to Ishbel and see if I could pick you up. But those bottled funny faces tackled me and—well, the *Gold Bug* is a washout. What are we gonna do now, Chief?" There was a rueful smile on McLennan's red face.

"If we can reach the laboratory we still have a chance of accomplishing something, Mac," Sandhurst told him. "You have seen enough of the invaders, and what they have done, to know that they are already masters of the earth. Unless we can find a way to defeat them it will mean eternal servitude for the human race, or extinction if the invaders will it. However, if we could somehow manage to destroy their wave projector, their power would be broken. The least we can do is try. You can go to the laboratory, or, if you don't mind changing clothes with me, I'll go, and bring back several extra suits of armor. Then we can return with the kids, and commence working on our apparatus."

"I'll start out when it gets dark," said Mac. "Doing cross-country stuff now would be too much like a caterpillar promenading through an ant hill. I might as well take a little preliminary look-around though."

Sandhurst walked with him to the mine entrance. Before he left his superior Mac handed him his canteen. "Be back in a few minutes," he said over his shoulder as he sauntered down toward the river.

The sound of Sandhurst's return along the passage aroused the youth. He arose to a sitting posture and glanced wonderingly about. It took him several minutes to recognize the scientist in the shadowy grotto, fogged as his mind still was, by sleep.

"Fay— Where's Fay?" When he located her small form huddled in the dust he raised her in his arms and kissed her wan cheeks impulsively. She gave a faint gasp as she awakened. Then there were low whispers.

Sandhurst looked away. He was smiling half amusedly, half tenderly. Wonderful, silly thing—young love; yet he knew that it was far more wonderful than silly. Years ago he too had felt its touch; then a sterner goddess had claimed him, and, with the iron goad of ambition, had driven him on to fame.

He did not look back at them again until he heard Vance calling his name. They were standing. The girl was still very weak from the ordeal of the night before. If it had not been for the supporting arm of the youth, her tottering limbs would have given way under her. Nevertheless she smiled faintly.

"Mr. Sandhurst, I want you to meet Miss Fay Gatewood, my fiancée."

A TRIFLE awed perhaps, at meeting so great a celebrity, she gave the scientist her hand. It was swollen under the bandages which Mac had wound about it after he had carried her to the mine.

Explanations were in order, and Fay kept Sandhurst busy with her questions: Where were they? Who had brought them there? What were they going to do now? What had happened to everybody?

Sandhurst did his best to make intelligent answers, and to reassure her. It gratified him very much to see that her spirits were rising. She smiled quite gaily, and her big dark eyes were once again full of expression and life —not dull and staring. If he had thought her beautiful when he had first seen her aboard the truck, she seemed more so now in spite of the mud and dirt that smeared her face and clothing. Yet it was a child-like beauty.

Fay told how the compulsion waves had come upon them. "You see, when I am at school I stay with my aunt," she said. "Vance was with me last night, and Auntie had just stepped out for a few minutes. We had finished our chemistry problems, for we often do them together. Vance was at the piano, playing, and I was just dreaming. Everything seemed so peaceful and secure that any misfortune—even a little one, just couldn't happen.

"Then came the blue star. We saw it and were admiring it, without ever imagining that it could be dangerous. All of a sudden they must have turned on some strange force up there. It took hold of us like a flash. I was terribly frightened, but I couldn't move and I couldn't even scream. Then something made us go out doors and climb into the truck." The girl's dark eyes widened at the memory of that fearful moment when the spell had dropped.

Fifteen minutes had passed. Mac would be back from his reconnoitering pretty soon. Sandhurst remembered that Fay had not yet seen his assistant, or the fantastic and slightly fearsome attire he wore.

"If a man dressed in a wire armor and hood comes in here, Miss Gatewood," he chuckled, "don't mistake him for an imp of Satan, because it will be Douglas McLennan, the fellow who is to blame for our being as safe as we are."

It was only several minutes later that Mac appeared. He was walking down the passage on tiptoe, and he looked back often, as though he feared that someone or something behind him would detect his presence. Sandhurst sensed trouble. He silenced his companions with a gesture.

Mac paused at his superior's side, and stood facing the entrance of the passage. A muffled whisper came out of his wire hood:

"There's light flickering farther in the mine, Mert. I saw them when I came in, and, I guess I ducked in here just in time. They're purple lights like those bottled devils give off. They were coming my way. Let's watch!"

The four stood huddled together, their eyes riveted on the small section of the outer passage which they could see. Presently a faint violet glow began to spread itself over the rough floor. It grew in intensity. A luminous globe, bearing the weird form of an invader floated into view and passed out of sight toward the entrance of the mine. Another followed it, and another. Sandhurst counted fourteen in all. For the space of many heartbeats after the last of them had departed the four adventurers neither moved nor spoke.

It was Sandhurst who first found his voice. "They probably have a station of some kind in the back of the mine," he whispered hoarsely.

An intense desire to examine and study things belonging to a civilization so totally different from his own, had taken possession of him. With McLennan at his side, and the students following, he moved stealthily down the passageway. At the juncture with the main tunnel he paused and peered into the darkness. Everything seemed quite normal.

Motioning to Fay and Vance to remain where they were, he and Mac went to the mouth of the gallery. The sun was setting. High in the air to the west was a group of specks—the invaders who had just taken their departure. Momentarily they grew smaller, for they were hurrying away rapidly, seeming bent on attending to some urgent mission.

Sandhurst and McLennan looked at each other. Both had the same idea in mind. The Chief of Murgatroyd Laboratory could sense the broad grin hidden behind Mac's mask.

"Well, are we going to do it" he inquired, knowing perfectly well what the answer would be.

McLennan's enthusiasm was unmistakable. "Are we? Say—any time we'd let a chance like this go by!"

Sandhurst brushed aside any misgivings he may have had. Danger was all about them now anyway; besides the adventure he and his assistant were contemplating might actually have valuable results.

"Okay, Mac, old man, well be on our way then!" he said briskly.

"Mac and I are going on a tour of investigation up the passage," he told his young friends, in answer to the inquiring looks on their faces. "Remain here unless we call you."

The two scientists crept along the gallery, penetrating farther and farther into the bowels of the mine. The girl and the youth gazed after them until they had disappeared into the darkness.

A faint smile flickered on Vance's lips. "Fine chaps, both of them," he whispered. The girl nodded.

DOUGLAS McLENNAN and Merton Sandhurst stumbled through the thickening gloom for several hundred feet, without encountering anything more interesting than dust, debris of antiquated mining machinery, and a few bats which the invaders had not yet succeeded in scaring away. Somewhere a cricket chirped stridently.

Mac was in the lead, carrying a heavy automatic. It was he who got the first look up a branching tunnel, from the farther end of which proceeded a weird rosy glow.

He uttered a whispered exclamation of satisfaction and surprise. "Have a look, Chief. This is the place, and there ain't any mistake!"

Sandhurst craned his neck. He saw what looked like a laboratory improvised by beings from millions of years in the future. There was a cone of wire wickerwork in the center of the passage; from this proceeded the ruddy light. Around the walls were arranged many odd mechanisms. Conspicuous among the other appointments of the place was a long cigar-shaped affair of glassy material.

The men did not immediately detect the presence of any living creature. It was only after they had lost their first wonder at what they beheld, and had begun to go over the details, that Sandhurst noticed the bulbous, spindly-limbed thing that worked with calm deliberation over an amazingly complicated device at one side of the passage. Mac saw the creature too. They made a careful survey for others, but there seemed to be only this lone guard. What luck!

"Sit tight, Chief," said McLennan, and there was a grim note even in his faint whisper, "I'm going to pot this fellow."

On all fours he edged closer to the region of the rosy light. Thus he made his way to within fifty feet of the unsuspecting monstrosity. His armor of dull metal gave back no reflection in the dim glow, and otherwise he was as soundless and inconspicuous as a vagrant shadow.

His pistol arm came up. With cool precision he placed the muzzle of the weapon in line with the pulpy body of the invader. The report re-echoed ponderously along dusty walls.

"Got him, Chief! Come along!" Mac shouted.

Caring no more for stealth, they darted through the acrid haze of burnt powder toward their victim.

And then, they received the surprise of their lives. As soon as Mac, who was in the lead, entered the glowing, ruddy aura of the cone in the center of the laboratory, his feet left solid ground and, like a man suddenly gifted with wings, he shot slantingly upward. With a grunt of consternation he rebounded from the farther wall, and sprawled ludicrously amid a tangle of wires and glass.

"Scottie!"

Sandhurst had managed to check himself in time to avoid a similar experience.

"Oh, don't worry about me," McLennan assured him, as he picked himself slowly from the debris of a strange machine. "I'm okay." He had pushed back his hood so that he could wipe the beads of sudden perspiration from his forehead, and the red face thus revealed was a picture of disgust and ludicrous self-contempt.

Sandhurst was approaching closer to investigate the cause of the phenomenal occurrence when Mac warned him.

"Take it easy, Mert. The bottled monkey-faces got some kind of a dowrangle rigged up here to cut gravity down to almost nothing, and like a hiccupping fool I ran right into its field!"

Taking careful steps Sandhurst entered the laboratory. Mac was right about the gravity. It wasn't more than one-

sixth normal strength. "I feel like an over-grown fairy," Sandhurst chuckled.

"But don't lose your head over your ethereal qualities, or you're liable to resemble a pan of raw hamburger," Mac remarked dryly. "I've got a bump over my ear as big as a cannon ball, and it's bloody!"

Before inspecting the wonders about them, they deemed it best to attend to the invader, who, though mortally wounded, was still alive and conscious. Sandhurst scrutinized minutely the creature's spidery limbs and its fleshy ovoid body. The latter was covered with what appeared to be an artificial shell of glass. This, he surmised, was to protect it from the pressure of the dense earthly atmosphere. The shell was punctured and cracked now, where the bullet had penetrated it, and the bright red fluid that was oozing from the wound beneath the opening, gave evidence of the high hæmoglobin content of the invader's blood. Probably he had come from a place where the air was very rare.

The creature's six pairs of limbs, which twitched and trembled spasmodically now, were each fitted with a bundle of thread-like tentacles, fine and pink, like the stamens and filaments of a flower. The body, which expanded and contracted in labored breathing, was slowly turning livid.

The scientists examined with particular interest the face of the creature, its peculiar proboscis-like mouth set deep in the fleshy folds of its body, the countless seamed wrinkles and the light down of hair that covered the pink skin. It was a hideous visage, on which it seemed that some evil entity had left its stamp.

CHAPTER V

The Siege

SANDHURST reached out his hand as if he intended to touch the invader. With a peculiar hissing cry, the thing made a feeble attempt to spring at him. The act seemed totally animal, and evoked revulsion—it reminded Sandhurst of an angry snapping turtle he had once trapped. Yet there was nothing that hinted of the beast in the great dark eyes of the creature. There was intelligence there, perhaps more than human, and a smoldering hatred deeper and more everlasting than the blackness of hell.

Borrowing Mac's gun Sandhurst put an end to the mortal existence of this weird horror, who, with his fellows had planned and carried out the conquest of the world.

"We'd better call the kids to come and have a 'looksee,'" Mac advised.

But there was no need for doing so, for they were already coming down the tunnel. A timely warning saved them from a mishap similar to the one McLennan had recently experienced.

The party proceeded to explore the laboratory. The thing which naturally received their first attention was the conical framework at the center of the passage. Beneath the wire canopy was a shallow container of white enamel which resembled a huge saucer. In it, an opalescent fluid bubbled and seethed like boiling oil, and crackling darts of red flame played and interplayed between it and the wickerwork of wires and webby cables above. For a long time they stared at the machine, fascinated by the evilly gorgeous light that emanated from it.

Half sensing the purpose of the apparatus, Sandhurst touched the small wheel that rose on a thin spindle from a squat metal hemisphere near its base. Gingerly, he turned it a trifle. In response to his act, the boiling liquid lost some of its activity, and the rosy flame decreased in brilliance. Sandhurst gave the wheel another turn; the fire died down to an embered glow. But there was a more interesting result. Gravity was again exerting almost its normal earthly pull.

With a tingling thrill, understanding burst in upon Sandhurst's mind. When he had turned the wheel back to its original position, he lifted a serious face to look at McLennan.

"Do you know what this apparatus is?" he asked.

"Seems to be some kind of gravity nullifier, Chief," Mac replied. He had missed the full meaning of his superior's words.

"That's evident; but it is something else too, Mac." Sandhurst's tones were level and quiet like those of a physician who speaks of a patient whose hours are numbered.

"I've got it!" Vance cut in eagerly. "This machine is a working model of the apparatus the slaves are constructing at Ishbel—the thing we helped to build!"

Points of fire glinted in Sandhurst's gray eyes when he turned again to Mac: "Do you understand now?"

A look of surprised comprehension came into McLennan's rugged features. He started to fume. "Why, the dirty—!" But his chief silenced him.

"Keep it to yourself, Mac," he said briefly. "It won't do us any good to boil over now. We'll make a hasty examination of the things in this work-shop; then one of us will have to start out for our own laboratory without a moment's delay."

The girl laid her hand appealingly on his arm. "But Mr. Sandhurst, we don't understand, Vance and I. What is the matter?"

The scientist straightened. He saw the expectantly fearful expression in her eyes. Her hand was trembling. An impulse which Sandhurst was sure was not a part of his real self, made him want to take her in his arms and comfort her, tell her that there was nothing to fear and that all troubles would pass. But even if they had been alone, and if he had not known that she was already engaged, he would not have done so. Other women had aroused similar emotions in him, but for many years he had always held back. A subconscious belief that, to be successful to the limit of his ability in his profession, he must suppress all human feelings, was perhaps responsible.

"There is no need to deceive you, Miss Gatewood," he said. "It is already evident to you that the invaders have come to conquer—in fact have conquered the earth. Their intention is, as I believe, to colonize our world, and make a new home here for themselves. But, judging from the discoveries we have made, the earth as it is, is not an ideal place for the continuance of their race. They are accustomed to a much weaker force of gravity and a lower air pressure. However, with the aid of their scientific knowledge they seem to be capable of correcting these faults of environment. To do this they are constructing gravity nullifiers similar to, but much larger than this one here.

"When these machines are set in operation, the atmos-

phere, relieved of much of the force that holds it to the surface of the earth, will expand enormously—extend farther up into space. Since its volume will be vastly greater, it will necessarily be much less dense—more rarefied. The result is clear. Unless we can find some way to avert the catastrophe, and Mac and I are going to make an attempt, practically all forms of terrestrial life will perish of asphyxia."

Fay had paled a trifle; still the savant could not help but admire her brave smile. "Thank you for being so frank, Mr. Sandhurst," she said. "I always believed in fighting, but if death is our lot, so be it. Anyway it will be a glorious death. Just think, no people in any past age ever faced such odds, or had the opportunity to die as we and our fellow men may die!"

It was a grim ghastly little joke, yet Sandhurst smiled at it. There was no chance to deceive the girl; she knew what their chances were.

VANCE, Fay, and Sandhurst were scrutinizing with nervous haste the cryptic maze of cables, rods, and fantastic crystalline devices that lined the walls of the laboratory. There was very little that even the savant could understand. Most interesting of anything the students saw was the carcass of the dead invader, and they paused over it, asking many questions.

No one took any notice of McLennan. He had wandered off by himself, to the opposite end of the laboratory where squatted the torpedo-like object. He found an oval door in its side and, having opened it, crept into the interior. The only thing which encouraged inspection here was a small flat box set in the concave floor, near one end of the pointed, tubular chamber. Mac toyed with the two small levers which protruded from the box, one moving in a vertical and the other in a horizontal plane. Nothing happened. Dissatisfied, he turned the tiny dial on top of the box ever so slightly.

A dim, scarcely noticeable aura, like that of the invading globes, suffused itself over the transparent walls. He pressed down lightly on the vertical lever. The torpedo trembled in its metal cradle, then slowly, a hair's breadth at a time, it rose and floated free several inches above its supporting framework. Almost imperceptibly it was edging forward. Pleased with the result of his experiment, McLennan twirled the dial back to a point a little beyond its original position. The torpedo's motion was reversed, and it drifted over the cradle again. Shutting off the power entirely, he allowed the strange machine to come to rest. There was no need of testing the horizontal lever for he was quite sure that he knew its purpose.

Interest in his discovery of the gravity nullifier, had, during the past several minutes, taken from Sandhurst much of his realization of the danger he and his friends were facing in their present position. But the knowledge that they had entered a cul-de-sac was presently recalled to his mind with a startling jolt.

Blue lights were flickering on the walls of the passage which they had recently traversed—lights where there had been darkness before! Fay and Vance saw too, and understood.

It was useless to prepare to fight, Sandhurst knew; therefore, with all the level-headedness he could muster, he looked about for some avenue of escape. Extensive searching was unnecessary, for it was all too evident that they were trapped. It was impossible to retreat farther into the mine, for the gallery ended here. And there wasn't a single nook or cranny in which they could find refuge.

The returning invaders were in sight, wavering weirdly through the gloom. Well, it didn't appear as though anything could be done except to offer some makeshift of a defense. Vance had already drawn his automatic.

"Hey, come over here quick! We'll spoil their fun yet!" It was Mac yelling from beside the torpedo.

Mechanically Sandhurst and the students obeyed. McLennan hustled them into the torpedo's interior, climbed in himself, and slammed the door.

"Hold on like everything! We're going to ride right through those bottled funny-faces!"

He had thrown himself down at full length before the box of controlling mechanism. No longer cautious, he moved the levers and dial as boldly as though he had been born to the task. He knew that to be bold was their only chance for salvation. But it was quickly evident that he was far from expert. The craft shot upward and thudded with a painful jolt against the roof; it dipped, swung sideways, and its nose dug deep into one wall. Mac clung frantically with one hand to a tiny stanchion, and with the other, he tried to work the unfamiliar controls. His companions, not understanding clearly beforehand what was going to happen, tumbled and rolled about him before they could catch hold of the small pegs, set at regular intervals along the center of the floor.

Meanwhile the invaders had arrived. Fiercely they circled the captured flier, sending angry darts of flame crashing into her hull. The thick glass-like substance was a good insulator, for the passengers felt only slight shocks as evidence that any of the force of the thunderbolts had penetrated to the interior of the craft. But even these were disconcerting, and added to Mac's difficulties.

Grimly he clung to his post, fighting for a semblance of control, and, after a fashion, he succeeded. Wobbling crazily, the craft dashed down the tunnel toward the freedom of the outer air. Any moment might send them crashing to death against the sides of the passage. But there was no choice. They had taken their only chance for life and freedom. With luck on their side they reached the entrance of the mine.

Mac sent the flier rocketing at full speed up into the dusk. The enemy globes were soon left far behind. The craft climbed upward for what must have been twenty thousand feet. It leveled off there, having reached the greatest altitude it could attain.

The hull, transparent to normal light was impervious to the compulsion waves and so the passengers encountered no difficulty from this direction.

Manipulating the lever which steered in a horizontal plane, Mac looped around and headed east toward the Murgatroyd Laboratory. Guiding the stolen craft was comparatively simple out in the open.

THE light of the purple meteor aided McLennan in picking out the ribbon of a roadway, and the squat massive building which capped the subterranean workshop where Sandhurst and he had conducted so many fascinating experiments.

Mac dived down steeply, leveled off, and let the glassy cigar settle slowly to the ground, close to the rails of the laboratory's side track. Near-by was a big trapdoor in the

ground, ordinarily used to lower supplies and equipment to the chambers below. This would serve as an entrance for their vessel.

Two men, clad in armor similar to McLennan's, were hurrying toward them. An invading globe, shining balefully through the dusk, wobbled off toward Ishbel.

Days of tense activity followed. The entire laboratory staff participated with feverish energy in the preparation for the bid for freedom. They were resourceful workers all; but the difficulties they faced were worthy of their mettle. Materials were hard to get, and, where formerly it had been possible to have their equipment made outside the laboratory, it was now necessary to improvise everything they needed in the protection of their buried workshop.

Warned by some subtle means, the invaders strove fiercely to destroy them. Late in the afternoon following Sandhurst's return, a cordon of big guns went into action and for over an hour filled the air with shrieking missiles that battered against the superstructure of the laboratory, reducing it to a tangle of twisted girders and metal plates that loomed vaguely through the fog of nitric oxide which enveloped them. High overhead a squadron of bombing planes, mockingly displaying the tricolored insignia of the U. S. Air Service, swooped and circled. The sunlight slanted on their metal fuselages and wings.

Only dim echoes of warlike sounds penetrated to the subterranean laboratory. The inmates had taken the precaution of blocking all except one small elevator shaft leading to the surface. The food supply was not large, but there was no immediate danger of its being exhausted. For a short time at least they were safe.

Following the bombardment, waves of khaki-clad slaves poured over the ruins. Finding nothing to kill, they undertook the task of digging the scientists out of their burrow. However, this would require weeks of hard labor to accomplish. There were layers upon layers of concrete, reinforced by steel rods and interspersed with sheets of tough metal, to be penetrated.

Yet there was one thing which gave Sandhurst grave cause for alarm—the freight trapdoor. If that were discovered, or smashed by a shell, all their hopes might easily go glimmering. McLennan, aided by Hahn and Seabrook, had carefully piled refuse upon it to hide it from view. Beyond that, nothing was possible but to trust to luck.

One night, in the sky above Ishbel and other towns, scattered hither and yon over the world, patches of dim, rosy radiance appeared. During the nights that followed, the fiery areas of light brightened progressively, as the power, fed gradually to the huge gravity nullifiers to avoid serious mishaps, increased in strength. Hour by hour the gravitational force of the earth was being diminished. The atmosphere was expanding, rarefying. If the loss of gravity continued for long, at its present rate, all breathing creatures native to the planet would soon be dead of suffocation.

It was early morning. A light frost had spread itself over the fields and hillsides. Around Murgatroyd Laboratory battalions of armed slaves squatted. Their breathing was labored and unnaturally rapid; yet, though the impotent minds in their skulls sensed that the controlling entity meant to destroy them shortly, still their bodies continued with fierce courage to obey that entity.

Their eyes watched the ruined buildings which stood up clear-cut and bizarre through the thin atmosphere. Their frost-bitten hands were ready to raise rifles to their shoulders should any of Sandhurst's band make his appearance. Doubtless many of the minds behind those lifeless masks were already mad. Over their heads, fierce-eyed invaders aided them in their vigil.

A plane sagged sloppily only a few hundred feet above ground. Its propeller was racing inefficiently in the thin air.

With abrupt suddenness the tension of silent watching among the slaves and invaders was relieved. The great trap-door beside the laboratory swung open and a cloud of yellow vapor puffed up out of the pit it covered. In lazy rolls and eddyings it poured out toward the enemy.

The invaders, realizing that the yellow gas would bring quick death to them should they inhale even a trace of it, beat a hasty retreat. This was no time to meddle with these queer human demons who had defied them. The compulsion waves commanded the slaves to retreat also.

A vibrating whir thundered throatily out of the well which the trap-door had covered, and presently a long glass torpedo floated up into view. Its nose was turned obliquely toward the sky. Rapidly it gained momentum in its steep climb, became a mote against the blue, and faded from sight.

CHAPTER VI

The Last of the Entity

McLENNAN held the flier's controls. They demanded all of his attention so that he could scarcely take note of the many novel impressions that were coming to him from all about. To be hurtling up and up like that produced some weird sensations—made a fellow's head light and giddy and the rest of his body, especially his stomach, as heavy as lead.

Far below, the earth had diminished to a great saucer-like panorama of dull greens and faded browns, here and there flecked with bits of blue-gray that were lakes.

Sandhurst was at the stern of the flier, watching anxiously the metal braces that held the straining propulsion ray projector in position. The construction of this device had been his chief care during the days of preparation. The energy units of the airboat they had captured from the invaders had been insufficient to raise it up out of the atmosphere. And so the scientist had found it necessary to make use of his own ingenuity.

He had been rather successful. Driven by the powerful backward thrust of the propelling beam, their rate of climb was terrific. It drew the blood from the faces of the adventurers and made specks of blackness dance before their eyes.

Sandhurst would have liked to build a flier that was completely his own; however, since time was pressing and materials were hard to get, there was nothing he could do but make use of the captured vessel. It seemed to be serving the purpose remarkably well.

Why the savants had chosen Fay and Vance to accompany them may seem strange in view of the fact that they might have selected others more competent to cope with the vicissitudes of the hazardous venture. Sandhurst

knew that the quality of their mettle had been proven, and the insistence of the youth that they be given the honor, had been so eager and zealous that refusal was next to impossible. Sandhurst and Mac had capitulated.

In spite of the danger of their position it was evident that the students were enjoying themselves. True, they clutched fiercely at the improvised hand-grips; they were perhaps a little frightened, yet their fear was not the agonizing fear of terror; it was that mild thrilling fear, which makes the hazard of adventure so fascinating.

For his own part, Sandhurst was undergoing the most glorious experience of an eventful life. The threat of death was there, but who cared? The shrieking wind of their hurried flight, the drone of machinery he had created, the earth, dimming to a blurred fairyland behind, and the silent mysteries of the universe unfolding all about, gave rise in him to an ecstasy which, a month before, he would not have believed himself capable of feeling.

He watched the two rockets of the invaders that pursued them. Gradually they fell behind and faded in the mists of the atmosphere. Sandhurst smiled in satisfaction.

The tortured screech of the atmosphere, as the flier tore on its way, was fading, for they were approaching the outer limits of the earth's blanket of air.

Vance and Fay were gazing up to where the violet of the sky was deepening, darkening. The girl raised her arm and pointed to a tiny pinpoint of light that glowed steadily against the soft, cold purple.

Almost simultaneously, Mac made a similar discovery. "We're getting up in the world, Chief," he shouted. "Stars! Whew, what a climb! My head's buzzing like a hive o' bees!"

"But it's worth the pain," Vance put in. "Just think, nobody, anytime has ever been up this high before. Look at those stars! And the sun's shining! Look at it!—Fay, Mr. Sandhurst!"

Visibly, as they mounted higher, the solar disc climbed through the grey mists of the atmosphere. It was ruddy and baneful.

"Like a blood-red bubble surging up through a sea of—opal," Vance muttered softly.

Only the muffled whir of the projector was audible now, and so Mac heard the phrase. "Poetic lad you are," he chuckled amusedly without turning, "like the chief."

"Silly ass, maybe," the boy rejoined with a sheepish grin.

"Don't mention that characteristic of mine, Mac," Sandhurst said, with a show of benign sarcasm, "I'm terribly sensitive about it."

But McLennan was ready to stop talking. "Shut up, you guys," he growled. "I'm busy. There's the meteor coming right toward us."

The visiting orb had climbed out of the grey fog at the western rim of the world and was moving visibly in their direction.

They had cleared the terrestrial atmosphere now, and were riding in empty space. The sun, ringed by the silvery wisps of its corona, glowed fiercely in the black, star-shot firmament.

The purple meteor which, since the reduction of the earth's gravitational force, had taken a new path more distant from its adopted primary, was approaching alarmingly near to the flier.

Through their binoculars the occupants of the craft could see the jumbled ranks of great elongated crystals that bristled from its spherical form. Those crystals glinted and scintillated with frosty glory in the strong sunlight, and from deeper within them, another duller, more sinister light surged forth with livid balefulness. The adventurers thrilled at their nearness to the source of the power which now ruled the earth.

A BROAD belt of coppery metal about its equator, and a hemispherical structure of the same material bulging up from one point in the circumference of the belt, was the only visible evidence that intelligent forces had been at work on the tiny planet. No invader was in sight. Yet it became apparent to the watchers now that this could be no meteor but was a creation of intelligent beings. It was undoubtedly a space ship.

With the power turned almost full on, Mac swung eastward, seeking to parallel the ship's orbit. Slowly it crept closer, until it was abreast with the flier. At an even velocity they coursed along side by side. Though the speed of the two bodies must have been many miles a second, it seemed to Sandhurst and his companions that they hung almost motionless in space.

Cautiously McLennan was edging nearer to the arching dome of crystals that spread out beside them, like a serrated forest of spikes. It was fully fifteen hundred feet in diameter.

"It looks as though the coast is clear," McLennan stated. "Shall we land?"

"Not yet, Mac," Sandhurst said. "They may have some kind of a trap set for us. We'll test them out first." He was toying with a small machine inclosed in a box of polished hardwood.

Fay was searching the sky toward the rear. "The invaders are catching up with us," she warned.

Sandhurst saw that the two rockets were in sight, but were still a long distance away. Their propelling mechanism had not reached full efficiency until they had escaped from the atmosphere. He smiled grimly. No need to bother about them yet.

His fingers deftly manipulated dials and buttons on the control panel of the box. Responding to his commands and directions sent to it by radio, a small cylinder detached itself from the rack under the hull of the flier, and with quick darting movements, resembling those of a dragon fly, it propelled itself toward the invader's ship. For a small part of a moment it maneuvered, then it dived and crashed against the hemispherical boss on the metal belt of the ship. A puff of smoke, mingled with flying fragments of the hemisphere, was the only evidence that an explosion had taken place. There was no sound. A thin, white vapor steamed up out of the rent.

Sandhurst sent another torpedo upon its way. This one he guided into the hole which the first had made. The result of its detonation was immediate. The compulsion waves, pouring from the ship, winked out.

At a warning from the girl, Sandhurst turned his attention to the pair of invading rockets which were now almost upon them. Streams of flaming gas boiled fiercely from their stern nozzles. So close had they come that the hate-filled eyes of the invaders who piloted them were plainly visible through their transparent walls. From

the nose of each rocket a thin rod was reaching out—pointing suggestively at the occupants of the flier.

However, the latter never learned the sinister nature of the enemy's weapon. Sandhurst quickly accounted for the rockets with his torpedoes. The torn bits of wreckage drifted slowly to the surface of the ship.

"Nine—ten—out!" Mac called briskly. "How about making contact?"

Sandhurst nodded assent.

The flier settled to a landing, grating lightly against the sharp, crystalline surface of the great ship, whose gravity was barely adequate to keep the craft from drifting away.

Through the transparent hull, the adventurers could look down into the interior where the hemispherical structure had been. Vapor still poured from the hole, causing a faint patch of frost-work to form on the side of the flier, but this scarcely hampered their view. Far down, perhaps fifty feet or so, they saw, amid a tangle of junk which had once been an intricate device, a bloody, bulbous thing. Its body was gashed and torn, and hideously swollen because of its sudden exposure to the vacuum of space. Its form was that of an invader, yet it was much larger than any that had been seen on earth.

"The controlling entity," Sandhurst announced softly, with a touch of awe in his words. "Here he sat, like a little god, and for almost a month, ruled the world, sending his commands out over the compulsion waves. And now he is dead."

"Thanks to Mac and you, Mr. Sandhurst," Vance said seriously.

Mac laughed in mock scorn. "Don't give us big palookas all the credit. It ain't right. Remember that Fay and yourself and a lot o' luck are in on this, too."

"Mac is certainly right," Sandhurst put in briefly but emphatically.

He was examining the interior of the great ship. It was deeply pitted with many large ellipsoidal cavities. Thin tendrils, like those of some kind of plant, looped out of several of them. With a puzzled frown he peered through the hull of the vessel at the crystals which had not been touched by the explosions. Dimly, far down in their depths he could make out many large oval shapes which looked like huge bubbles. They were connected with one another by passages which seemed to be carefully drilled. In each cavity, grotesque forms of an odd vegetation were visible.

Sandhurst nodded understandingly.

"What is it? What have you found out—Chief?" Fay inquired.

"Something I've been wondering about for a long time, Miss Gatewood. I never could imagine where the invaders came from. You see, oxygen and water are necessary for the existence of all forms of life that we know of. I thought that oxygen and water couldn't be held on this ship long enough for them to come from—wherever they originated. But these people had an endless number of novel tricks up their sleeves. Look down at those cavities. See all the queer things growing in them."

"YES, but how—?"

"It's quite simple, I think," Sandhurst continued. "When this ship was made and when still in a hot and plastic condition, vast bubbles were formed in its thick, transparent crust. When the crust hardened, the steam that had formed the bubbles condensed into water. The air that had been mixed with the steam of course remained as a gas. Both of these requisites of life were thus sealed in the bubble cavities where they could not leak away. The rays of the sun could penetrate to those cavities through the light-transmitting rock. Conditions were ideal for life, and so, inevitably, it appeared, and began its slow evolutionary climb. Here the invaders evolved, amassed knowledge, increased in numbers and became ambitious. Here they made the plans which I believe and hope will be their destruction."

Fay insisted that they go on a tour of exploration over the entire ship.

For over an hour they glided low over its surface, searching out the myriad artificial caverns in the amorphous, glassy substance beneath the crystals. Most of them were filled with vegetation, but in some, the vague forms of strange machines could be made out. Nowhere was a single invader to be seen. Apparently the entire population, with the exception of the controlling entity, had been recruited to serve on earth. They could not come back, for the atmosphere of their world was leaking rapidly into the void through the opening the torpedoes had made. In a short time it would be completely dissipated.

The flier arose from the earth's adopted satellite and with snowflake lightness, dropped toward the blue-gray haze of the great air-ocean below.

McLennan was looking back at the receding bulk of the purple ship. "Curtains," he said musingly, "fine show."

There was a shadow of a smile on his lips, and it hinted of something which one would not have thought belonged in the personality of the burly, practical Mac.

To all four members of the party, it seemed that a sudden, soothing calm had taken possession of the universe.

On earth the work of reconstruction went quickly forward. The invaders, coming as they did, from a small world, were not numerous. The slaves, once again masters of their own bodies, destroyed them one by one. The old routine reasserted itself, and presently only great, silent enigmatic devices standing neglected and alone, were left as reminders of the days of terror that had been.

A month after his first invasion of space, Sandhurst received a telegram from Borden, the astronomer whose phone call had heralded the coming of the purple meteor. The message was dated from Flagstaff, Arizona. Borden tendered his congratulations, and informed Sandhurst that he had been a slave in that city.

A short time later, Vance Pierre dropped in at the laboratory. "The world is more than its old happy self to me now, Mr. Sandhurst," he told the scientist gaily. "Fay and I are going to be married day after tomorrow."

Sandhurst wished Vance good luck, but his own words seemed somehow flat and colorless to him. He wondered why. He had come to look upon the boy almost as a son. There were things he would have liked to confide to Vance—things which came dimly to him from the days of his own youth, before the hard-hearted mistress of his ambition had claimed him. Yet he kept silent, for such was his way.

THE END

RED APRIL, 1965

By **Frank K. Kelly**

(*Illustration by Paul*)

Everard had leaped at him. He was forced to shoot. Livingston stood perfectly still, horror written on his face.

RED APRIL, 1965

By the author of "The Radium World," etc.

THE hut, a square room with dusty wooden walls, a table and chair, a long board counter against one of its sides, a scattering of patriotic posters above the door, occupied a quiet backwash in the tide of War. It dozed in a sultry afternoon peace, undisturbed by the distant thud-thudding of heavy guns or the occasional sullen swish of a passing fire-shell. The Y. M. C. A. attendant slept blissfully on his stool in a corner of the counter, limp magazine relaxed in his lap. Even the flies with which the room seemed infested clung in apathy to the smudged windows.

Captain Livingston, writing his monthly letter to his wife, at the table, disturbed the silence only by occasional mutterings and exclamations, punctuated by fresh attacks with his pencil. Once he laid the ragged bit of wood down beside a worn notebook, and stared thoughtfully at the pleading figure of Columbia that some ultra-patriotic soldier had plastered to the opposite wall.

He was looking through the soiled robes of the tattered Columbia, through an intangible curtain of time and distance, through the madness of war, to an aching vision of Georgia fields in planting time, and a certain white-pillared home in the midst of them. He saw again Anne, his wife, whom he had not seen since his last leave almost two years ago. He saw her as she had been then, fresh, clean, untouched by the blight of war. And his hand, closed so tightly about the ragged bit of pencil that the wood bit into the flesh, brought him back with the pain to reality—the grim reality of the hut.

He sighed, and began laboriously to scrawl in the notebook. "Canadian Line, April 7th, 1965. My Dear Anne:—" He hated to write letters. It came to him suddenly that he was beginning to yield to the madness of hate for the war. 1965! Four years! Four years since he and Elman and Lacey and Joe Dietrich had gone to enlist in the Tank Division of the Third Army.

Elman—Elman had gotten a sliver of fire-shell through his head at the first Battle of Chicago; Lacey—Lacey was a gibbering idiot at Bellevue, mouthing incessantly of rolling curtains of laughing fog; Dietrich—Dietrich was legless, his right limb a stumpy crisp burnt off by the hot touch of a cathode ray. And he—they called him "Lucky" Livingston, a man who bore a charmed life, because he had come through four years in the Canadian lines with nothing worse than a scrap or two of poison shrapnel. He hated the vast stupidity of this war. Revolted at the charnel horrors of its crimes.

He thought of the new replacements coming up from the States, and shuddered, was sickened. Children, all of them, children walking blithely into this welter of murder, of scientific, ruthless slaughter. It was enough to drive a man mad; or to unutterable revulsion.

And they had told Elman and Lacey and Dietrich and himself that the war would be over in a month—think of it, a month! But they said to look what the Japs had done to them. Russian troops couldn't fight; Russians couldn't man gravity cruisers, serve robot artillery, build fighting tanks in gigantic quantities.

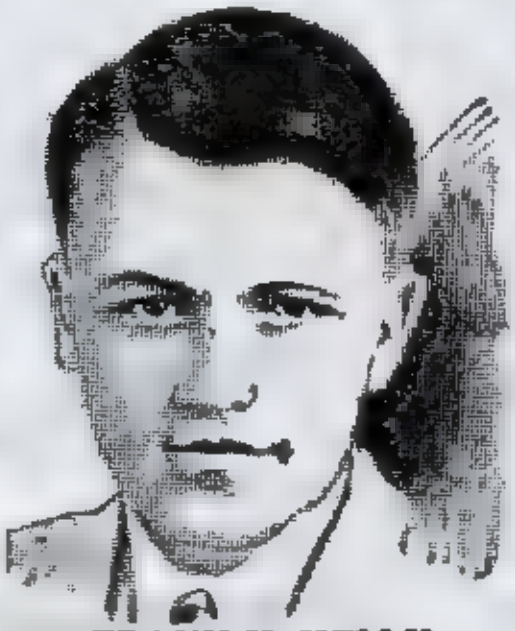
Russians couldn't possibly develop deadly gases to equal Lewisite and Nitron-Plus, which could kill a man horribly in twenty seconds; Russia had no giant cathode-beam tubes, no new cultures of unimaginable disease bacteria. No!

But, inexplicably, impossibly, Russians *did* have all those things. And Russians had used them. They were terrible, formidable enemies. Russian lines were rock-ribbed, almost unbreakable.

Thoughts of the American spring offensive came to him. Casualty lists that doubled and tripled daily. Advances that were lost ground the next day. Wasted men. Wasted guns. Wasted C-tubes, and ammunition and gravity cruisers. Smashed, broken tanks. Waste. The great American system. Waste, that the generals safely behind the lines might move their little red marker-pins an inch or so forward on the war map of murdered Canada.

And the newssheets in the "Y" huts were always the same: "AMERICAN LINE HOLDS IN CANADA! TANK CORPS MAKES DARING RAID IN RED TERRITORY! RUSSIA REPORTED WEAKENING!"

Censored. Even the audiovision broadcasts, sent out



FRANK K. KELLY

FROM our experiences in the World War, and from what we have learned of military progress since then, it is becoming quite evident that warfare has become a game of machines rather than men. How far this process will be carried no one knows; but it is quite evident that it will go on until weapons of destruction are produced that far outstrip our imagination.

Machine warfare has done one notable thing already. It has killed off the possibility of isolation for a nation, and made the invasion of far-off lands almost as easy as those nearby. New means of transportation and improved communication between the parts of contending armies have made of warfare a lively game of power and scientific precision.

Young Mr. Kelly exercises his good talents now on a tale that shows both the callous, passionless brutality of future warfare as well as its human and pathetic elements. This story should certainly serve to enhance this promising young man's reputation.

weekly to the haggard men in the front lines, were faked, closely censored. His own letters were censored, though he wrote only of victories and the excellent condition of his own health. Excellent health—*here!*

A faint movement at the door disturbed him. He looked up and saw the sleek black head of Sam, his negro servant, who had followed him to the front, and enlisted in his tank company. He said a little irritably:

"What's the matter, Sam?"

"Captain, suh," Sam said apologetically, "what does you-all want wid dese here matches?"

The captain twisted his pencil between his fingers. He looked at his notebook. He looked at the wall, the windows, the "Y" clerk asleep in the corner. And finally, reluctantly, guiltily, he met Sam's inexorable eye.

"Matches? What matches are you talking about, Sam?" he asked blankly.

Sam's wide mouth gaped at him.

"Ain't Lieutenant Cla'ence done tol' you we's getting three cases o' matches in today from de depot at St. Looie?"

The captain groped absent-mindedly, utter bewilderment on his square features. He shrugged, gave it up.

"Eh—of course. Of course. Matches . . . Matches. Eh—what would you suggest, Sam?"

SAM swelled proudly. De cap'n askin' *him* for advice! Guess that wouldn't be somethin' to tell that high yaller gal back in Bummin'ham when he got his next leave! Surely make her quit foolin' round wid dat no-'count nigger from Memphis double quick!

"You jes' leave it to me, cap'n. Ah gits dat no-good Grandiloquent Jones, and us goes down an' meets dat ole flyin'-train when she comes in. We'll git dem 'ere matches for yo', Cap'n. Don' you worry none 'bout dat!"

He withdrew his head. The captain wondered vaguely what Company M would do with three cases of matches, and promptly dismissed the matter from his mind. He resumed his interrupted scrawling.

A faint far-off buzzing disturbed the sultry afternoon peace of the room. The captain frowned. He closed his notebook, put his pencil back in his pocket, and went to the north window.

High up against the line of the northern horizon a thin rank of red-glinting specks moved across the sky. Blue exhaust flames leaped out in long bright plumes behind them. The faint buzzing grew, changed subtly into a hollow explosive thunder.

The red-glinting specks emerged from a bank of patchy clouds and revealed themselves as trim, rakish gravity cruisers, a Scarlet Squadron of bombers. Silver arrows catapulted to earth in their trail, exploded viciously in hot bursts of sound and steel leaving gaping craters in the pitted ground of Canadian farm land. Sapphire beams fingered out from steel-hooded ports in the hull of the flagship, dug smoking gashes in every object against which faint blue rays lingered. Bursts of spitting fire-shell showered groundward.

Eyes suddenly cold and hard, Livingston recognized the shining scarlet of that oncoming Squadron of Death; it was Krenski's Red Circus. The fleet of strafing bombers that came over every afternoon and showered efficient Soviet death on the American lines. Nitro concentrate. The new picro acid. Sapphire heat rays, and cathode beams. Three-ton torpedo shells . . . And sometimes deadly little pellets of gray dust, alive with virulent bacteria.

The captain made a hasty exit from the Y. M. C. A. hut, leaving behind him a startled and nervous attendant, who had refused none the less to risk the certain dangers of a break to the tank company's camouflaged encampment. He preferred the dubious safety of the hut's concealing top-canvas.

Seconds later, Livingston, shouting frantic commands to his shield operators as he came into the narrow company street at the run, heard behind him a sudden definite concussion that was very near. He turned, and saw the remnant of the Hut vanish beneath the stunning impact of a fire-shell.

He swung on his men, who were, with a rapid efficiency and utter coolness that bespoke veterans, working desperately at the business of dismantling tents, personal baggage, the general impediments of troops on the march, storing every movable object in the dubious safety of the tanks. Forty seconds later the camp, with its serried rows of metal-cloth tents and camouflaging canvas, had completely vanished, to be replaced by a ring of beam-shields extending in a perfect hemisphere twenty feet into the sky.

The scarlet-glinting squadron above, almost disdaining the sudden frantic stir of activity below, passed over with but the taunting salute of a few bombs and a display of interplaying beams. The Circus vanished in a few minutes, sinking swiftly below the southern rim of the horizon. Neither bombs nor rays had perceptible effect upon the tank company's up-flung beam shields.

Livingston looked after the vanishing squadron, and swore fervently. He knew that Krenski's Circus had a definite objective that day, and that objective would almost certainly be the one least prepared for sudden, devastating attack from the air. It had been that way now for a month.

He prayed for sight of an American cruiser flotilla, that even though outnumbered hopelessly, might at least make a gesture of resistance to this arrogant passing of the enemy. But there was none. Sight of a fighting gravity cruiser with America's color insignia on its prow was a rare thing, even to the men in the front lines.

It was a whispered rumor that American G. H. Q. was massing all available air forces at a southern base in the rear, preparatory to a great surprise attack with tanks and cruisers in the Fall. Livingston did not think it likely. G. H. Q. was chary of wasting valuable fighting ships. Camouflage and beam shields were cheaper. Cheaper!

But there was a restless feeling all along the line; this front had been too quiet lately. Either the Red War Council was planning for another sledge-hammer drive, or American G. H. Q. was scheming an offensive. The quiet along the Canadian front was felt to be the quiet before the storm—a storm that might leave the American Allies victorious, or utterly beaten.

Livingston, after a consultation with his officers, decided to leave the shields in operation. There was a chance that the enemy squadron might return that way. Livingston ordered all the men into the tanks.

HE had scarcely entered his own battle-tank when the insistent ringing of his audiphone buzzer and the

flashing of a signal-light apprised him that some foreign body wanted passage through the shields.

He picked up his phone, and signaled on his own built-up vision-beam that he was ready for both audible and visual reception. A tight v-beam caught his, and a face began to take form in the established projection.

The shoulders belonging to the face showed the insignia of an Intelligence Colonel. The face spoke in a cold voice:

"Colonel Grenham, Intelligence, speaking. Is this Captain Livingston?"

Livingston said cordially: "Yes, sir. Just a minute, sir, and I'll have you through those beam shields. Had to put them up a moment ago. The enemy sent over a squadron of bombers, and we needed protection in a hurry."

Grenham's face vanished an instant. Then:

"Cut off, Livingston. Your man's letting us through."

The tank captain broke the connection and waited. A minute later the armor door of the narrow control room opened, to admit a lean, clean-shaved man of about forty.

Livingston shook hands, and remembered afterward thinking that the man had eyes like agates set in stone. He said:

"Sorry for the delay, Colonel."

Grenham looked at him. "Forget it . . . What squadron of bombers was it?"

Surprise lay in Livingston's voice.

"Why, Krenski's I think. Couldn't be sure at the distance, but the ships were scarlet."

"How long ago did they go over?"

"I think—I remember looking at my wrist watch when they dropped the egg on the Y hut. Quarter to three, it was then. That answer you, sir?"

Grenham smiled a little grimly.

"It does. At three-ten they bombed one of our central munitions dumps in Michigan. Wiped it out of existence. Somebody'd been tampering with the shields guarding that dump; they didn't come on when those three-ton eggs started down . . . Score one for the Slav."

Livingston whistled.

"That's nine times in the last month they've pulled something like that. It looks—"

Grenham stared at him hard. "It means, Livingston, that there's a leak somewhere in this sector. Somewhere. I've got reason to think that it starts right here."

Livingston's lips tightened. "If you think—"

"You're out. I know your record. But you've got some other officers. Replacements. Where were they at three o'clock this afternoon?"

The tank captain stiffened.

"I ordered all men into the tanks as soon as we got the shields up. Called the roll. Every officer in this company ."

His voice died away. Grenham smiled tightly. "Go on."

Livingston said:

"I can't. Lieutenants Everard and Clarence didn't answer roll-call . . . It couldn't be Everard or Clarence, Colonel. I—"

Grenham interrupted him savagely. "It might be one —or both. We've got to find them, Livingston!"

CHAPTER II

A Case of Matches

"WHUFFOR de cap'n sends us to it dese 'ere matches?" Grandiloquent Jones asked. He trudged heavily in the choking heat of the road from the tank company's encampment to the mono-rail station. He was wiping his black face with a yellow handkerchief.

"Cause Ah tells him to, nigger," Sam said proudly. "De boys ain't had no smokes for most a week now, and dey's gittin' awful snappish. Gotta keep 'em shootin' at 'em ol' Reds, dat's whut."

Grandiloquent stopped, and put scrawny hands on even scrawnier hips. Grandiloquent was as small and shrivelled as Sam was big and spread-out. But he was smarter than the bigger man and knew it. He said scornfully, scoffing:

"*You* tells de cap'n! Go 'long wid you! Wid mah own eahs Ah heahs de Lieutenant Cla'ence tell de cap'n dat we gits dese 'ere matches in today. De cap'n tol' you to bring back de matches quick as you kin git yo' no-'count se'f down to de station 'n back—'n take dat Grandiloquent Jones wid you to keep yo'se'f outta trouble, dat's whut!"

Sam stared pityingly at him. "Ain't you got it through yo' thick haid yit dat de Cap'n kain't 'member nuthin'? He done forgit all 'bout de matches quick as Lieutenant Cla'ence turns 'round! Ah tells him—"

He cut himself short to listen. There was a faint staccato throbbing, a distant buzzing like the sound of a myriad bees quivered from the brazen dome of the sky. He wrinkled his black nose.

"Whut dat?"

Grandiloquent, looking up, grasped his arm shakily, and breathed: "De Red Rockets! Us runs!"

They ran. Grandiloquent followed frantically at the fast-moving heels of Sam, whose feet were stirring dust in great clouds from the spurned road. Every instant they expected the stunning impact of a fire-shell, the hot touch of cathode or heat-beam . . . But, somehow, they made it.

They dived together under the protecting camouflage of the mono-rail station at the same instant that a nitro bomb burst in the exact center of the road behind. Grandiloquent's dusky sheen faded to a sickly tan.

"Dat's us!" he whispered awedly to the panting Sam. "Bomb hit right where us was two jumps ago!"

Sam nodded, shuddering at sight of the gaping hole in the road. "Ah've got to sit down, Grandiloquent!"

He spied a pair of likely-looking boxes up-ended on the freight platform. Knees wobbling, he staggered over and sat down on the nearest. Grandiloquent deposited the weight of his thin frame beside him.

"Now us waits for de cap'n's matches," Sam said, already comfortable. But Grandiloquent was tugging insistently at his sleeve

"Look over dere, boy," he whispered. "Dat bench in de co'ner. If tain't Lieutenant Cla'ence, Ah admits Ah'm a dumb nigger."

Sam looked. A lean, scholarly man, with great shell-rimmed glasses and small white hands that were never still, half-crouched on a bench in a secluded corner of the station. Sam recognized him as Lieutenant Clarence. His eyes, nervous behind the glasses, were fixed in a tight

stare on the face of the great clock in the wall. At intervals he glanced furtively and briefly around, moved back still farther on his hidden bench, and returned to his tense clock watching.

"Whut's de matter wid him?" Sam whispered hoarsely to Grandiloquent.

"How does Ah know? One thing Ah knows, Ah don' like it. Nebber did like dat 'ere Lieutenant Cla'ence. Ain't nobody in de company like him, 'cept mebbe de cap'n, and Ah don' think de cap'n thinks as much of him as he lets on . . . Ah don' trust de Lieutenant, Sam."

"Yo' not sayin' you thinks dat de Lieutenant is one o' dese here spy Reds, is you?" questioned Sam in awe. Grandiloquent plunged recklessly.

"Ah does think so. Whaffor he actin' that way, if he ain't?"

"Ah don' know. Us watches him, and finds out." Sam got up cautiously from the box, and followed Grandiloquent to a point of vantage beyond the lieutenant's line of vision. Apparently he had not seen them.

As he got up from the box, Grandiloquent glanced down curiously at the flaming characters stenciled on its sides. He gasped, his knees went wobbly, and when they were safely established in a secluded corner, he demanded in a fierce whisper:

"Know whut yo' dumb haid set us down on, nigger?"

Sam looked completely surprised.

"Whut you mean?"

"Mean? Ah means we've been sittin' on two cases o' nitro concentrate, dat's whut I mean!"

Sam's breath whooshed

"No!"

"Shut up. Now us finds out whut Lieutenant Cla'ence's up to. Might even make us Co'p'rals, Big Boy, does us ketch a Red spy."

SAM wrinkled his nose thoughtfully.

"But whut about de cap'n's matches?" he demanded. "Us promised de cap'n us'd bring him dose matches, and us brings 'em."

Grandiloquent leaned closer.

"Ah thinks," he confided impressively, "dat de lieutenant wants dose matches!"

Sam looked at him in admiration.

"Boy got to hand it to you, Grandiloquent! You sho' thinks wit yo' haid! Dat's jes' whut he is tryin' to get! Wants de matches hisse'f; ain't gwine let de boys hab dere smokes dat dey craves."

Grandiloquent snorted disgustedly.

"Foolish man! De lieutenant—"

But Sam wasn't listening. He was staring beyond the smaller colored man, looking in the direction of the lieutenant's bench. He gripped Grandiloquent's arm tightly.

"Look there! He's talkin'!"

Grandiloquent swung around and stared. The lieutenant, after a quick glance around, had taken a pocket radiophone out of his uniform and put it to his lips. His eyes were fixed on the clock in the opposite wall. It was exactly three in the afternoon, Central Standard Time.

The lieutenant moved his mouth rapidly, spat a staccato stream of words to an unseen listener. He did not make visual connection. After some moments, his lips ceased moving and he listened. He nodded slowly, whispered a single word. And finally, he broke the beam connection and slid the phone back into his uniform. Grandiloquent noted that his thin face was suddenly very white and tense.

For several seconds the lieutenant did not move. Then, as though forcing himself, he arose stiffly from the bench, clambered over a miscellaneous pile of freight cases stacked in front of his niche, and made his way slowly to a station attendant.

He engaged in a low-toned conversation with the soldier. Finally he nodded, said something indistinguishable, and turned away. His nervous eyes fell then upon Sam and Grandiloquent. He made a queer gesture of surprise, and came toward them.

"What are you men doing here? I thought orders were for all enlisted men to stay in camp until further notice. An explanation please, and damned quickly!"

His voice was rather thin, nasal, altogether unpleasant. His words stung the two colored privates to sullen resentment. They saluted stiffly, and said nothing.

The lieutenant frowned.

"Answer me! What are you waiting for?"

"De cap'n," Grandiloquent announced in a frigid voice. "Done sent us to git dese 'ere matches whut's comin' on de flyin' train. Us ain't leavin' till we gits 'em."

The lieutenant's attitude underwent a transformation. He looked inexplicably pleased. He nodded.

"Good! I'm here for the same reason. Captain Livingston wanted me to see that these matches were handled properly. I was beginning to wonder what to do about them. You two can help me load them in my machine and take 'em back to the company camp. Splendid!"

"Yessuh," Sam and Grandiloquent answered coldly. The lieutenant looked a little puzzled but said nothing. He stared hard at them for a minute; and:

"At ease. I'll be back when the train's in. We've got twenty minutes to wait."

He disappeared down the freight platform. Sam asked, "Now whut'll we do?"

"Nuthin'," Grandiloquent returned airily, "only see dat dese matches does go to de cap't, dat's all! If dey don't—" He made a significant motion. "Yo' knows whut dey does to spies."

"You mean us captures de lieutenant?" gulped Sam.

Grandiloquent nodded impressively. "Shush. Heah he comes."

The head and shoulders of the lieutenant appeared above the edge of the freight platform. A throbbing thunderous sound broke the quiet of the station abruptly, and died as swiftly away. The lieutenant cut a switch.

"Come over here!"

Grandiloquent and Sam obeyed. The lieutenant was mounted on an ancient mono-cycle, model of 1961. There was a single great shining wheel, like the metal body of some ponderous steel monster, supported from falling of its own weight by the dogged spinning of two small gyroscopes. A car was swung behind that great wheel. And directly over it hung the driver's seat, a precarious thing of leather and metal, in which the lieutenant now sat—or perched.

"The matches," Lieutenant Clarence was saying, "will be stacked in the car here, and you men will ride behind with them. The cases shouldn't be of much size. Understand Sam, Grandiloquent?"

Both nodded comprehensively. The lieutenant hesi-

tated a little, moistening his thin upper lip. He looked at the clock. It was approaching twenty minutes after three.

"All right. You'd better be getting over there. Three-twenty's due in any minute now. Step lively!"

Sam and Grandiloquent moved, not at all reluctantly. They took positions on the steel floor of the discharging platform.

GRANDILOQUENT, looking up at the shining ribbon of the mono-rail, noted that the metal was humming and whining. There was a slight trembling in it, a slow swaying that spoke of the swift passage of some very heavy body. And suddenly, far distant, Grandiloquent caught the hard-bright glint of sun on metal, and a gray stellite cigar flashed into view. It came on at a wild speed that made the body of the single car but a blurred moving spot that skimmed along under the steel ribbon of the rail.

The flying train swept in like the great silvery projectile she was, her streamlined sides flashing and playing in the gold rays of afternoon sun, luminous backwash from her side rocket-tubes swirling madly about her. She struck the shock chamber a fierce blow, plowed stubbornly into the heavy resistance of thick retarding gas, and came at last to an unwilling stop. A circular door in her smooth side slid open; a man's head looked out with impatience.

"All right, you guys," the head rasped. "Grab this stuff. We're six minutes minus on schedule. Snap into it!"

Boxes and cases flowed in an even stream out upon the discharging platform. Complaining soldiers in the gray unrform of the S. O. S. moved forward reluctantly and shouldered their miscellaneous burdens with a bitter chorus of mutterings.

Sam and Grandiloquent kept their eyes glued upon the circular opening in the car, each straining for first glimpse of freight for Company M. And presently there emerged from a thinning stream of the sinews of war, three cases labeled "MATCHES—CO. M." which the complaining soldiers passed by in disdain. Sam and Grandiloquent pounced upon these.

The cases were heavy. Tattered remnants of baggage stickers were only faintly visible on their weather-worn sides, so that it was difficult to tell from what depot they came. Most of the wording on the crates had been obliterated, save for the single word "MATCHES."

Grandiloquent lifted a case to his shoulder, and sniffed skeptically.

"Huh!" he whispered to Sam. "Dese ain't no matches! Ain't no matches Ah ever see dat weighed dis much. Dese ain't matches, Big Boy!"

Sam agreed with him. But the cold eye of the lieutenant was impatiently upon him, and he struggled with alacrity across the platform, heaved, and deposited the first case in the mono-car. Grandiloquent followed with the second, and by the time he had dropped it in its place Sam had gone back and picked up the last.

They finished. The lieutenant looked the cases over carefully, and nodded.

"All right. Get in."

They climbed shakily in beside the stacked cases, and took firm grips on the worn sides of the car. The lieutenant ground his heel down hard on the starter. The motor whirred, coughed, groaned, settled down with reluctance to an even throaty grumble.

The mono-cycle swung viciously out from the freight platform, bounced into the foot-deep ruts of the pitted road with a sickening jolt, and sped off.

The lieutenant punished the accelerator vigorously, while Grandiloquent and Sam, leaning over his shoulder, watched their speed-indicator rising in leaps to 45—55—60—. It was quivering at 65 before the squat steel bulk of the mono-rail station had vanished behind in a cloud of acrid road-dust. Sam and Grandiloquent battered uncompromising angles of the car with the more tender portions of their anatomies, and managed to hang on grimly.

They came to a section of the road that was more deeply rutted than what had gone before, and the lieutenant swung the cycle around viciously. Grandiloquent gasped into Sam's ear:

"Crossroads! Us ain't gwine to de supply tank! Us took de wrong turn dere!"

"Whut we gwine do 'bout it?" demanded Sam caustically. "Does us try to capture de lieutenant, he shoots us's skin full of holes wid dat big pistol-gun! Ah ain't achin' to fool round wid no spies! Us is li'ble to get killed, dat's whut!"

Grandiloquent groaned in misery.

"You is right! Us does nuthin', and does it plenty!"

CHAPTER III

An Accusation

"THE first thing to do," said Grenham thoughtfully, "is to call a meeting of all your officers and men, and question them as to when they last saw Lieutenants Everard and Clarence. We might get some unexpected information, Livingston. What do you think?"

Livingston said:

"Right." He picked up his audiphone. "General attention! Every man, give me audible connection on phones at once!" He waited; and when a faint voice came from his instrument, "Company's at attention, sir!" he said:

"Good, Lieutenant MacDaniels. Have your men report in a body outside my battle tank at once. You'll get further instructions here."

"Yes, sir!" Livingston broke the connection.

"They're coming," he said quietly to Grenham. The Intelligence man nodded. "I'll leave the questioning to you. You'll get more out of them than I would—"

He broke off queerly, a strange tenseness in his lean face. "Quiet, Livingston! Somebody's got a vision-beam tightened up on us! Don't say anything, but get a look at that board."

Livingston moved his eyes a trifle, and brought within his vision the sensitive signal board that was normally rigged up with the beam shields. Now a spot of red light was flickering wildly in a warning tube; the buzzer was silent, evidence that whoever was watching them had not yet used audible connection.

Grenham said, and Livingston was unable to see his lips move: "Give me your General Attention phone."

Puzzled, the tank captain handed him the super-powered instrument. Grenham leaned toward Livingston, so that his body hid the little phone. Then he built up a following visual projection and fingered for contact with the spying beam.

At a very low application of power, he got it. He and Livingston saw first the slender hull of a gravity cruiser lying motionless high in the upper atmosphere, underwent the dizzy sensation of plunging straight through gleaming scarlet metal, and were looking into the control-room of the spy ship.

A man sat in that control-room, his hands flying over a ponderous bank of keys, his eyes on a giant vision-plate directly in front of him. Grenham and Livingston saw themselves in image on the pulsing sheet of the great screen. The man watched them with narrow, frozen Slavic eyes.

"Say something!" whispered Grenham suddenly. "We've got to act as if we know nothing, suspect nothing, aren't even aware of his vision-beam. Talk, Livingston! He's going to make audible connection!"

Livingston set his face into an unreadable mask, and began to exhaust inconsequential nothings. Grenham listened with the utmost solemnity, and inserted grave nods at the proper places; but both were watching narrowly the figure in the built-up visual projection.

They saw boredom, disgust, complete disinterest growing in the cruel face of the watcher. After listening some minutes to their inconsequential mouthings, he turned his head and spat a sentence in Russian.

The round metal door of the control-room slid silently back into the wall, there was a harsh shuffling sound, and there entered the field of Grenham's vision the most horrible figure he had ever glimpsed in four years of warfare. It was a thing of some glistening metallic alloy, squat, propelling itself slowly on four tentacular legs of steel, three thin arms dangling as it walked. An eye that sparked a flickering yellow glow was mounted in the quivering metal of each side of the rectangular head.

A slit mouth opened, muttered a string of harsh monosyllables, and closed. The grotesque thing dropped its eyes submissively before the man at the controls.

He slid out of his seat and barked a fusillade of words at the monster. Nodding its travesty of a head, it took his place at the controls, shot out the three arms toward the high bank of keys, and flung a switch.

With an absolute abruptness, the scene vanished from the sight of Grenham and Livingston. At the same time, the red light on Livingston's signal board ceased flashing.

Livingston sat half a minute in stunned silence.

"Think they caught on that we were watching?"

Grenham shook his head.

"No. I'm nearly certain they didn't. The fellow with the nice eyes decided evidently that we weren't worth listening to any longer, and ordered his—that thing to shove off. The robot obeyed orders—it must have been a robot, that creature, don't you think?"

Livingston said thoughtfully, half-shuddering:

"It probably was. They've got something new. Looks like we're in for a pretty stiff offensive . . . Unless G. H. Q. has something up its sleeve to beat that thing."

Grenham looked very grave.

"We haven't, Livingston. We haven't. There's a chance, though, that the enemy may have only a few of those Robot creatures. Lord, think what it must cost to build one of the things!"

Livingston nodded. "Why d'you think they were spying on *us?*"

Grenham glanced at him. "Obvious. They were hoping to get in touch with one of your men—either that or warn him that we were on the look-out for him. It cinches my belief that the leak in the sector starts right here, Livingston."

Livingston gave a great start. "Good Lord! The men! They've probably been waiting for us to show up outside since Heaven knows when! You'll want to talk with them, Colonel!"

Grenham nodded. "Lead on, Captain! I'll follow!"

THE monocycle roared up to a brush-covered culvert directly under the frowning nose of a giant tank, paused an uncertain instant, and stopped. The grumbling of the motor choked off into a hum.

"All right," the lieutenant said, descending agilely from the harness of the driver's seat, "we'll drop those cases here. Get down."

Sam and Grandiloquent deposited themselves tenderly beside him, but made no move to obey his first words. They looked at each other.

"Does us capture him, Grandiloquent?" whispered Sam, so loudly that Grandiloquent paled beneath his dusty skin and flung him a glance of withering scorn. The lieutenant moved backward in a rapid motion, and jerked at his gun. His eyes hardened.

"Capture me! What do you mean?"

Sam, undaunted, blurted before Grandiloquent could stop him: "Tell him us thinks he's a ol' Red Spy, and us means it!"

The lieutenant reddened with anger. His eyes were icy.

"Spy! Why, you damned insubordinate nigger—"

He lifted the gun significantly.

"Get those cases down!"

Stubborn to the last, Sam and Grandiloquent still hesitated. The lieutenant's finger tightened around the trigger. His thin face was very pale. He told them evenly:

"You are insubordinate. If you do not obey me, I have military right to kill you here. I *will* kill you, unless . . . Get those cases down!"

Sam and Grandiloquent moved. They worked feverishly, conscious of the gimlet glance of the lieutenant upon them.

They were done presently, sweating. The three cases lay in an even line in the high, rank grass of the culvert, effectively concealed.

The lieutenant hesitated a little, fingering his gun. He was swearing to himself. Grandiloquent caught grim scattered words: "Damn them . . . Can't do it . . ." His jaw tightened. And at last:

"All right. Stand in front of that cycle, and when I give the order, start moving. And keep moving, or I—"

He made a horrible grimace. Sam and Grandiloquent shuddered, moved trembling knees, and took their places directly before the towering bulk of the single great wheel.

The lieutenant leaped up into the driver's seat, prodded the motor with a vicious toe.

Half running, half walking, half stumbling, Sam and Grandiloquent kept ahead of the cycle, always conscious of the grim figure behind them in the high seat, and the ever ready gun. They skirted the gaping ordnance of a fighting whippet, swung past the dark grim bulk of huddled supply tanks, and headed through the exact center of the company's encampment.

Grandiloquent, one eye upon the cold figure behind, groaned abysmally to Sam:

"Us was wrong! Lieutenant ain't no Red spy! Us is gwine to de cap'n's own battle tank!"

Sam turned a black scowl to him.

"Us! Whut you mean, *us?* Ah nebber done nuthin' 'cept listenin' to you!"

The lieutenant's voice crackled behind them. "Quiet, you!" They relapsed into morose silence.

The monocycle came even with the open armor door of the captain's battle tank and stopped. The lieutenant got down and pushed the gun into Sam's back.

"In there!"

They went into a narrow metal-walled cheese box that smelled forcefully of gasoline and burnt explosives. Catwalks branched off through half-open man-holes into crowded, suffocating gun-pits.

Livingston and another man in the khaki-and-silver of a ranking officer, with colonel's insignia on his shoulder-straps, sat talking near the view table of the tank's battle periscope. Maps were spread out on the table, and the hawk-eyed man's finger stabbed forcefully down on them. Grandiloquent caught odd words:

"Here! And here! And the camouflage . . . Perfect. I tell you, Livingston, there's a leak somewhere . . ."

The conversation stopped at the appearance of the lieutenant and the two cowed privates. The lieutenant saluted. The captain returned perfunctorily, and told him:

"Colonel Grenham, Lieutenant Clarence. The Colonel is an Intelligence officer, Lieutenant, down here to investigate certain leaks in the communications of this sector. That bombing squadron—Krenski's it is, I think—has been active again. And uncannily accurate as usual. The Colonel thinks there must be a leak somewhere. You will give him full cooperation, of course."

THE lieutenant nodded. Then:

"Captain, I must report these men with me, Privates Smith and Jones, as guilty of the rankest insubordination. They absolutely refused to obey an order that I gave them, until forced at the point of my gun. I recommend a military court-martial immediately. They—"

"Cap'n, suh," broke in Grandiloquent desperately, "de lieutenant is lyin': We wouldn't do nuthin' like that, nossuh. He's a Red spy, dat's whut! Wouldn't let us take dose matches dat you tol' us to git from de train and bring 'em to de s'ply tank like you said; 'stead he makes us put 'em in a hidin' hole under de nose ob de communications tank. An' at de station we saw him hidin' in a co'ner by hisse'f, talkin' to somebuddy on de radeephone. He's a spy, suh. Don' you—"

Grenham said suddenly: "Where were you at three o'clock this afternoon, Lieutenant?"

The lieutenant flushed. He looked uneasy.

"I was at the mono-rail station with these two men, sir. Waiting for the arrival of those three cases of matches."

Grenham shot a sudden question.

"Let me have a look at your phone, Lieutenant."

The lieutenant paled. His hand went slowly, reluctantly, into his uniform and came out holding the tiny instrument. Grenham's steely fingers closed about his wrist.

"None of that, Lieutenant . . ." And to Livingston: "He was tampering with the meter adjustment." Grenham studied the phone several seconds in silence, no change of expression visible on his impassive face, and at last passed it without comment to Livingston. The captain took the thing gingerly into his hand, glanced harassedly from the stiffened lieutenant to the two frozen colored privates and back again, and stared at it. Incredulous horror leaped into his face.

"Lieutenant! Your phone is adjusted to a forbidden wave channel. Your energy consumption shows that it has been used recently. Have you any explanation? Remember, man, the importance of the thing! You must have some explanation!"

The lieutenant said, mingled disgust and embarrassment in his trembling voice: "Can't a man talk to his wife in this war? I used the phone, Captain, to talk to my wife in Michigan. I must have been insane. But we were only married a few weeks when the war came, and I haven't had much leave to see her since. You know that, Captain. And I was crazy to talk to her, see her!"

Livingston's expression changed. He wanted to believe. It was an explanation. He looked half-appealingly at Grenham, who was smiling ironically.

"It is an explanation, Colonel."

"Quite a touching one, Captain." The steel voice hardened. "Call your wife now, Lieutenant. Use this phone."

He pushed the little instrument across the table. The lieutenant's jaws tightened into a stubborn line.

"I tell you, she wouldn't answer," he said desperately, "I was to call her at three o'clock exactly. Never at any other time."

"You called her today, at three?" Grenham was leaning forward; his voice was smooth, silken.

The lieutenant hesitated. "Yes."

"And today, at three-ten, Krenski's circus bombed a munitions dump in Michigan whose beam-shields failed to come on when they started dropping eggs. Of course, it was a coincidence, Lieutenant. They happen, these coincidences . . . But not in war!"

Grenham made no attempt to place any special accent on the last four words, but the lieutenant stiffened jerkily, and closed his shaking jaw. A pulse beat in the younger man's pale throat.

"Call your wife, Lieutenant. Reassure her, inform her that all is well with you. Call her now, Lieutenant!"

His gun pressed gently against the white forehead of the other man, just between the staring eyes framed by the yellow-rimmed glasses. The lieutenant set his teeth.

"Do not think, Lieutenant," Grenham said slowly, "that I would hesitate to pull this trigger if you refuse to obey me. There is more, infinitely more at stake than your one life. There are men who will die if you do not speak, thousands of them . . . Call—your wife, Lieutenant."

In the face of the younger man a vast bewilderment

was growing. His thin brows knitted in a puzzled, dazed frown.

"But I don't understand, sir. How my calling my wife— You don't believe me! You think—you actually think I am a spy?"

Grenham looked at him impatiently, skeptically.

"What do you think I've been saying? Haven't you just admitted that—"

The lieutenant smiled a weary smile.

"I understand perfectly, Colonel. If it will ease your mind, sir, I'll call Gene. You can talk to her yourself if you wish. I assure you she's a perfectly good American citizen, patriotic and all that. She works in a munitions factory in Southern Michigan."

CHAPTER IV

The Great Offensive

LIVINGSTON flashed a triumphant glance at the Intelligence Colonel. But Grenham, with a little cynical smile quirking at his lips, was watching the lieutenant build up audible and visual connection with distant Michigan.

There was, suddenly, an interruption. The warning buzzer of Livingston's phone sounded, and a red light flashed in the warning signal tube. The tank captain lifted the instrument. It was dour MacDaniels, the Scotch senior lieutenant. He had found Everard.

Disgust and contempt mingled in the Scot's crisp voice.

"Drunk, sir. Full to the eye-lids. He was hiding out to sober up in one of the supply tanks, Gorry's I think it was. Gorry found him."

"Good work, Mac," said Livingston; and to Grenham: "Want the fellow brought around, Colonel?"

Grenham answered, doubt in his voice: "Might as well."

And presently, while Lieutenant Clarence still angled with patience for his Michigan connection, the door opened and admitted two grinning military guards and a slovenly figure that wobbled on uncertain legs between them.

"Lieut. MacDaniels presents his compliments, sor," said the bigger of the guards, "*and*—Lieutenant Everard."

Frowning, Livingston surveyed him, disgust and anger in a single cold glance. The lieutenant was a sorry sight. His eyes were swollen and glassy in a puffy, stubble-bearded face; his uniform cap hung dejectedly over one swollen ear; his tunic was unbuttoned, and smeared with the dark stains of some powerful-smelling liquid. His whole uniform sagged on his drooping frame with a hang-dog look. He looked, briefly, like the disagreeable aftermath of the "night before."

Livingston motioned at the delighted guards. They faded discreetly away, still grinning.

"Stand up!" said the captain, his voice icy, lashing. "What happened to you, man? You're a disgrace to the Service! Why, you—"

Grenham stepped suddenly past him. His hand shot out, gripped the sagging wreck, and brought the bleary face close to his eyes. He stared a long minute, and nodded with an abrupt satisfaction. His hand dropped swiftly to his hip and came up with a gun, pointing at the sodden Everard.

"Cut it, Lieutenant! You're no more drunk than I am!" To Livingston: "He probably spilled the stuff all over his uniform, saturated himself with it, smashed his face up a bit, and allowed your men to find him." Then to Everard again:

"You've got some explaining to do, Lieutenant. You should have waited a bit longer before you let yourself be found; a few minutes more and we'd have had your friend here ready for a military court! But this rather puts a different face on matters. Doesn't it?"

"Pardon me, sir," broke in the voice of Lieutenant Clarence, "I've got Michigan at last, sir. If you want to talk to Gene—"

Grenham shot a single searching glance at the clear, fresh face of the palpably American girl imaged in the visual projection, and grinned. "You talk to her, Lieutenant. I'm busy."

He caught the lieutenant's answering smile before he turned back to a suddenly erect and alert Everard.

"What's the difficulty, Colonel?" inquired the "wreck" in a cool, steady voice. A match flared, was held a moment against a cigarette hanging limply between flabby lips. Everard grinned at him calmly through a pall of smoke.

Grenham's gun did not waver. He said:

"I'm just curious, that's all, Lieutenant. Just curious. Would you mind? . . ." His hand passed in a quick, searching motion over the other's body, came up holding a tiny, well-hidden instrument. He glanced at the meter adjustment, energy consumption needle, directional finder, and smiled tight-lipped. His eyes met those of Everard.

"Clever man! What could be more innocent?" But beneath his banter he was puzzled, angry. The phone was perfectly innocuous, irreproachable. A sudden inspiration came to him. He held the phone up to the light. And, though his fingers were wrapped tightly around the adjustment switch, there was *space* between them and the wood!

He ran his hand down the length of the lever. A soft rustling sound whispered in the room. He grinned at the frozen eyes of the lieutenant.

"New dodge, Livingston! Observe! Not invisible ink alone, but also invisible paper! . . . I think G. H. Q. will find the writing on that paper fairly interesting, Lieutenant. And you yourself are intriguing! There's a mystery about you . . ."

A queer indistinguishable sound came from the tightened lips of the "wreck." It sounded to Grenham oddly like: "For Russia!" He never knew exactly, because the following instant Everard had leaped at him like a wild animal. He was forced to shoot.

Even the rather fatuous voice of Lieutenant Clarence breathing inconsequential nothings to "Gene," died abruptly into shocked silence at the sound of the shots. Livingston stood very still, perfect horror written in his expressive face. Sam and Grandiloquent, almost forgotten in a corner of the room, grabbed each other frantically for mutual comfort and safety, and shut their eyes.

Grenham said after a moment:

"Regrettable, but necessary, my dear Livingston. You needn't look so shocked. After all, this is war, you know . . ." And to Sam and Grandiloquent: "You two men! Carry him out of here! . . . And see that he gets a decent burial; he was an enemy and a spy, Livingston, but rather a brave man . . .

"And when you've done that, you two, come back here immediately for further orders. I'm going to need liaison men, messengers, for certain communications that can't be trusted to wave broadcast."

SAM and Grandiloquent saluted, and went out, carrying their gruesome burden between them. Livingston tore his eyes away and said dully:

"Will you need me, Colonel?"

Grenham stared at him a minute.

"I rather think I will. We've got to see to the deciphering of Everard's papers. No time like the present. And we don't know but that the Slav may begin his offensive tomorrow. This information, Livingston, is vital."

He had already tested the papers with an infra-red flash lamp and found that with considerable exposure they could be made visible. They were tied with a thin string of colorless parchment. He cut it with a paper knife and spread several sheets of crinkled document out under his fingers.

For an instant his bewilderment was complete. The paper appeared not to be covered with writing, but with some incomprehensible system of sign symbols. Then distant regions of his memory came to his aid. Seconds later he grappled with the truth. It was shorthand!

He looked up. "Livingston!"

The tank captain said: "Yes. Want me, sir?"

"I do. What do you know about shorthand?"

Livingston stared.

"Shorthand! Practically nothing, Colonel. I didn't take it in my high school cramming. But Lieutenant Clarence there—he's rather a bug on the subject."

Grenham whirled. "Lieutenant! You're not *still* talking on that phone, are you? Cut it! Come here!"

Lieutenant Clarence reddened. He murmured something into the phone, smiled, and cut off He came over to the table.

"Yes, sir?"

Quite irrelevantly, Grenham said:

"What reason did Everard give for sending you after those fake matches, that we've got good reason to think were something else again?"

The lieutenant hesitated, coughed. He said, embarrassment in his voice and face: "Why-uh-Everard told me these cases contained—uh—a certain liquid that a few of the officers have been wanting for a number of weeks past. Rather refreshing liquid, not—uh—intended to be brought to the notice of the Captain."

He grinned at Grenham, and winked one eye. Grenham chuckled. "So that's what you were so mysterious about! Well, I'll never—uh—bring it to the notice of the Captain."

He looked solemnly at Livingston, who nodded and laughed.

"The Captain hasn't noticed a thing!" he said.

Grenham underwent another metamorphosis. He was all brisk action again.

"And now, Lieutenant," he snapped, "sit down here and get to work on these papers. How soon'll you have them transcribed for me?"

The lieutenant stared meditatively, an eager look in his student's eyes. "An hour or two at the most."

"Then," said Grenham, "go to work!"

DAWN of April 8th, 1965. An American air base behind the lines. A gaunt fleet of dead black rocket cruisers lined up on the starting apron. Leather-helmeted fliers, stamping briskly to keep warm in the chill of the early Spring morning.

The vague dusk of the hour before dawn breaks. Pale streaks of rose tinged the eastern sky. A brisk figure burst from the hangars, shouting commands. Helmeted men dived for the control cabins of their monster ships, five men to a crew.

The commanding figure hurried to the leading cruiser, climbed in, waving his gloved hand. Colonel Grenham! He barked an order into his phone.

The staccato roar of nine great rocket motors answered him. Gas plumes flamed from beneath the sleek bellies of the black ships, turned frosty, and faded, to be augmented by others. The fleet lifted, soared up and onward into the gray murk of the dawn sky. A little group of men left on the apron stood still, staring, craning necks. The fleet was gone.

At twenty thousand feet, Grenham ordered rocket motors shut off, gliding air foils extended, gravity plates charged full power. The squadron went on, a silent fleet of nine black hawks soaring above the American lines.

At ten minutes past five they were over the Russian dugouts, so high that the sleek bulk of the mass of ships was invisible, unsuspected by the enemy below. Detectors in the Red lines caught no roaring sound of motors, no explosions of rocket tubes. The squadron of nine was a winging group of dark shadows.

Grenham said presently: "Hover."

The gliding ships quivered, withdrew air foils, hung motionless in mid-air. Grenham nodded, a grim look glinting in his eyes.

"Now," he whispered softly to himself, "we'll wait." His mind went round in a circle. He thought of the papers found on Everard, the spy he had killed. Could they have been planted, a decoy? No! He dismissed the thought as untenable. Everard would not have risked certain death for false papers.

And they had been a complete plan of the Red surprise offensive. At dawn on April 8th, they had stated coldly, the massed fleets of the U. S. S. R. were to be concentrated behind the lines in Sector B, Division 9, directly opposite the American Third Army. The fliers of the Red air force were to be replaced by—robots!

The Americans were then to be taken completely by surprise. Everard, by detonating electrically the three false cases of nitro concentrate, smuggled into the American lines as "matches," would destroy the communications for the Third Army. For an hour, or two hours, the American forces would be cut off from relief, from liaison with relief troops.

The robot air force, directed by *radio control* centered in a squadron of three mother ships, would sweep forward and wipe the Third American Army out of existence. Tank divisions, following in the irresistible wake of the united fleets, would mop up the fragment of the American forces that escaped.

Soviet victory would be complete!

There was one flaw in the plan. The mother ships, in whose hulls would rest the beam controls for the entire fleet, were very nearly helpless. They were almost unable to defend themselves.

No fighting squadron could be spared to protect them. All would be needed to strike a crushing blow at the American lines.

Hence, the Red War Council had made Titanic efforts to maintain utmost secrecy in the formulation of the plans for the attack. Only three men held complete information: the commanding general of the Red Armies, the Secretary of the Communist Party, and—Everard, Chief of Intelligence. And as a further protection for the control ships, they were to follow only in the extreme rear of the massed fleets, passing alone over that territory already swept clean by the advance.

Everard's plans, through Grenham, had reached American G. H. Q. Counter preparations were organized. There was one chance of an American victory: the helplessness of the mother ships.

Grenham was given command of a picked squadron of nine rocket ships, and told that with these he *must* wipe out the control fleet. He had accepted eagerly. A wild inspiration was in his brain.

This was the result. *Ambush!*

The purple squadron would wait, hanging like dark hawks in the upper atmosphere, until the whole of the massed Red fleets had passed below. Then—

They would drop down squarely on top of the following control group!

Grenham's thoughts returned to his little fleet. Faint sunlight was breaking over the horizon. Dawn was fully upon the sky. At any moment the Red fleet would pass over—to the attack!

He looked at his wrist watch. Twenty minutes after five. The vanguard of the Red forces should be in sight.

When he took his eyes from the watch dial, the whole northern horizon had leaped into sudden scarlet flame. A thunderous roaring beat against his ears. A queer exultant defiance swept through him. Let them come!

BELOW the stunned, almost awed, glance of the men in the Purple Hawks, the sky seemed flowing into solid scarlet. Massed ships passed by beneath in a molten stream, uncounted motors throbbing an unbearable, Titanic song of power. The air itself was shaking with the incessant explosions of innumerable rocket tubes, quivering with the sullen roar of shooting gas plumes.

Seconds passed, grew into minutes, and still the living stream of scarlet-painted ships flung by. Grenham shut his eyes. A vision of the American lines after holocaust had struck them rose before his mind. He shuddered, a mad refrain running through his head. It must not be! It must not be! It must not be!

Time passed. How long he never knew, but the roar of those massed motors had died into an angry hum, and the sky had taken on its normal hue when he looked again. He shook himself savagely, to clear his brain.

"Drop lower!"

The nine ships dropped gently.

"Hover!"

They stopped.

"Bombers to battle stations! Ray-men to C-tubes! Answer when ready!"

A silence. Then:

"The *Venture*, Trellis commanding, ready. The *Invincible*, Wretlock commanding, ready. The *Lincoln*, Dane commanding, ready. The . . ."

Eight voices came to him. The squadron was battle-stripped. They waited now only for sight of the mother ships of the enemy. And presently, it came.

Three specks of molten scarlet glinted in the north. Three faintly green luminous lines of rocket wash stretched out behind them. Three motors joined in a throbbing thunder.

Grenham saw three great hulks of shining scarlet metal, grouped in a perfect triangle formation. From searchlight-like mounds on their backs fire flowed smoothly, moulded into luminous cones that stretched to meet each other.

And in the exact center of that equilateral triangle, hung there by the interplay of forces from the three ships, hung a perfect sphere of blue light, swirling waves of wild color leaping across its bright face with every gentle rotation of the ball.

Grenham shouted:

"Bombs! Aim for that ball!"

Nine silver arrows dropped from nine hulls, sped downward ruthlessly. Eight missed. But one, hurled by a more perfect aim, shot squarely into the swirling center of the blue sphere.

There was a sudden mushroom of yellow light, a muffled concussion, and the sphere flickered, slowed its even rotation, while the white cones wavered, swung wildly. Then the sphere grew gleaming blue again, the cones stretched out fingers to meet each other, and the mother ships swept serenely on.

Grenham swore, and shouted frantically: "Up! For God's sake, up!"

Purple ships whirled up in screaming zooms, pursued by a vengeful finger of blue light leaping from the sphere. The luminous beam flickered gently over the lowest cruiser, and that great ship faltered, turned orange to red, and vanished into nothingness.

The remaining eight escaped untouched into the upper atmosphere. They halted, prepared to drop another flight of bombs.

Grenham said:

"One ship to dive straight down on that sphere, and try to drop two eggs before the devil's beam gets him. Volunteers?"

As one, seven voices came to him. He smiled grimly, proudly.

"Wretlock, commanding the *Invincible!*"

"Yes, sir!"

A single black ship detached itself from the rest, opened all gravity plates, discharged all rear rockets in a terrific burst, and shot down like a dark plummet toward the thing below. The other seven drove full speed ahead, turned, and came roaring at the three scarlet control ships on a long slant.

A fingering blue ray had found the black hull of the grim *Invincible*, was changing the jet of the sleek body from dark to orange and from orange slowly into red. But the American ship was close then; and at the instant that it vanished into nothingness, it launched two bombs.

The three mother ships dodged wildly, swung off at a mad tangent—and went squarely into the creeping barrage of Grenham's seven. A cathode ray found the sphere, drove its burning spear deep into the heart of the blue thing, and clung. Another followed.

The sphere whirled in a frenzy, swung madly between the scarlet sides of its protecting ships, flung back, and

exploded in a gigantic concussion, a wild spout of living flame.

That flame engulfed the three Red ships, carried them with it to nothingness, along with two of Grenham's grim black cruisers. But the victory was Grenham's—and America's . . .

Far distant, almost above the American lines, the scarlet fleets were wavering and falling, dropping down out of control. Squadron rammed blindly into squadron, fleet grappled savagely with fleet. Dead ships worked holocaust among themselves in a burning sky.

The battle of Red April, 1965, was won!

* * * *

In a darkened house far south of the battle lines in Canada, a white-pillared house of Georgian beauty, a woman tossed restlessly upon a great postered bed. Sleep would not come to her, but only vague thoughts of men fighting, fighting, killing and dying on a distant front of War. She thought of Tom Livingston, her husband, whom she had not seen since a brief leave two long years before, when he had come in haste, and gone hurriedly again.

He was bitter then, resentful of the madness and stupidity of war. His eyes were deep-scarred by the inner wounds of what horrors he had seen, his whole being a battleground of unrest. He had said she soothed him, helped him. She was grateful for that.

She sat up suddenly in the great warm bed, her hands clutching wildly at the soft pillow. A faint sound had come from the lower hall, like the distant ringing of a bell. The phone!

Who possibly could want to call her at this hour? She looked at the tiny wrist watch Tom had given her on her last birthday. Three-thirty. It was very late.

The phone rang again, impatiently. She had to answer. She slid quietly from the bed, put slippers on her bare feet, threw a bath robe about her, and went down the stairs into the lower hall.

A tiny silver bell was ringing, and a red light flashed in the paneled wall. Someone wanted both audible and visual connection!

She took up the phone, silenced the bell.

"Anne Livingston speaking."

"*Mrs.* Livingston?"

The voice was impersonal, hurried. The face of the speaker was cold and official. Anne said. a fear clutching her heart:

"Yes."

"Form 978. Section 24-X. First Notification From War Department. Official. Message follows:

" 'This is to notify you that your husband, Thomas L. Livingston, Captain, —th Tank Division, —th Regiment, Company M, Third Army, was killed in action on the Canadian Front at three o'clock this morning. He will be recommended for heroism and extraordinary bravery for his part in the Victory Offensive. You will receive further communication from the War Office. This is the First Notification. Acknowledge receipt of message . . .' "

But Anne Livingston had slipped quietly into oblivion. The impassive face of the Department Official stared at her an instant, eyes faintly puzzled. Then he shrugged, broke connection, and noted in his records:

"Message 3478-X Notification Of Death. Acknowledged."

THE END

What Is Your Science Knowledge?

Test Yourself by this Questionnaire

1. What is the maximum and minimum distance of Mercury from the sun? (Page 1167)
2. How often does Mercury rotate on its axis? What influence does this have on its temperature? (Page 1167)
3. What is the twilight belt of Mercury? (Page 1171)
4. What is the space-time geometry of D'Alembert and LaGrange? (Page 1183)
5. What is the Freudian interpretation of dreams? (Page 1185)
6. What can be used to counteract the disadvantages of living underground? (Page 1123)
7. What might be effect upon a person exposed to a tremendously concentrated high frequency electric field? (Page 1121)
8. What is the rotation of the inner moon of Mars around the planet? (Page 1139)
9. What two kinds of nerves have we? (Page 1143)
10. What determines the size of our atmospheric envelope? (Page 1150)

MUTINY ON MERCURY

By **Clifford D. Simak**

(Illustration by Paul)

The mighty sea of liquid rushed for the hole blown in the ridge, which separated the twilight belt from the hot side of the planet.

MUTINY ON MERCURY

By the author of "The World of the Red Sun"

TOM CLARK stared at the sword he held in his hand. It should have been in a museum, for it was a rare specimen. The steel was bright and the hilt was an example of workmanship in which the ancients had excelled.

It had been centuries since a sword had been used in battle. But on this day, in the atmosphere plant which supplied oxygen to the great quartz dome on the twilight belt of the planet Mercury, a naked blade had leaped and flashed, a weapon again. It was no longer a relic doomed to be regarded with curiosity by a race that had forgotten its use.

The blade had belonged to Ben Jacobs, an heirloom which had been handed down, in the name of sentiment, from father to son, for many generations. Undoubtedly it was worth a small fortune, for the museums of the Earth held only a few such weapons. But now Ben Jacobs lay in a heap on the floor of the plant, struck down by a burly Selenite.

To Jacobs the sword had been a symbol. He had carried it from the Earth to this forsaken planet, where the only evidence of life was ten huge domes of quartz set over as many mines, owned and operated completely by the Universal Ore Mining Company.

Only twenty-four hours ago he had told Tom the story of the sword. Now Jacobs lay motionless on the floor and the ancient blade was dyed with the blood of vanquished foemen.

Gently Tom lowered the point of the sword to the floor and gazed upon his handiwork. Before him lay three bodies. One was that of a Martian, a yellow-skinned, eight-limbed body, the skin covered with hideous warts. The grinning head, almost severed from the trunk, boasted three eyes, two in the same position as those of a Terrestrial, the other on the top of the hairless head. The mouth was large, as was also the nose, with the ears almost twice as large as those of an Earth man.

The other two bodies were those of Selenites, the gigantic Moon men with their small heads, their abnormally developed torsos and correspondingly large, powerful arms and their small, but singularly powerful legs, built on the same lines as those of a kangaroo.

Tom lifted the sword again and ran his fingers along its edge. They came away red and sticky.

He laughed grimly. The sword, ancient weapon as it may have been, had another tale added to the long list which had started, said legends, in the year 1815, in the Napoleonic Wars. For century upon century the blade had been regarded as a heirloom, a thing of sentiment. On this day, however, it had come again into its own. It had leaped and flashed, bitten deeply into flesh and bone, drunk blood.

CLIFFORD D. SIMAK

THE planet Mercury, one of the enigmas of the solar system, presents perpetually a source of wonder and speculation to astronomers. Its distance from the sun not only varies enormously (from 29,000,000 miles to 43,000,000 miles) but also it presents but one face to the sun. Half of its surface is thus a baking desert, whose temperature may approach 700 degrees Fahrenheit, the other half is a frozen hell.

Mercury offers unusual adventures for beings who could exist under its extreme conditions. Upon the borderline of day and night, an area whose temperature might be within reason for human existence could be found. But life would always be precarious, since Mercury has no atmosphere. It would be a world, such as our author shows, of violence, passion and sudden death.

Mr. Simak, whose "World of the Red Sun" met such approval, offers this as a second of his series of imaginative, yet realistically told adventures.

Stepping over the body of one of the Selenites, Tom made his way to the side of the prostrate figure of Ben Jacobs. He had seen Jacobs felled like an ox by the huge fist of one of the now dead Selenites, but there was a chance the man still lived.

Kneeling on the floor, he placed his ear to the breast of the prone body. There was not so much as a flutter of the heart. Tom turned his attention to Jacobs' head and what he found there convinced him the brilliant young scientist, who had been in charge of the atmosphere plant, was no longer alive.

Tom stood up and gazed about the death-ridden room. It presented a spectacle of ordered complexity with its many dials, tubes, pipes, valve controls, motors and the huge central control board. A silence, which was only accentuated by the steady hum of the machinery, assailed him and he suddenly realized he was the only Terrestrial alive at Shaft Number Nine.

Outside there might still lurk a few of the Selenites and possibly a few Martians, but they would be few. The only machine gun at the station, spitting out over 150 atomic pellets every minute, had wrought havoc among the mutineers before a stone, thrown by one of the Selenites, had bowled over McGregor, the radio operator. The latter, who had been taken unawares by the outbreak, had been unable to reach his post to send out an S.O.S.; and had philosophically, and entirely in keeping with his Scotch blood, done the next best thing by unlimbering the gun and turning it against the mob of howling miners who were destroying the radio station.

If McGregor had been at his desk, as his duty required him to be, instead of playing a few hands of cards with old Andy Schwartz, the head engineer, word of the uprising and an appeal for help would have been sent out at once. Failing in this, he had at least saved the mine and costly apparatus from immediate destruction, by the simple process of reducing the number of hands for the performance of the pending destruction.

The uprising had been a complete surprise, coming just as the second shift was coming out of the shaft and the third shift ready to go down. The miners in Shift Number One, evidently by a pre-arranged signal, had come storming forth from their quarters as soon as the attack was launched.

Evidently the captains underground had been neatly disposed of, for there had been no warning anything was amiss. The first indication of trouble came when the men had come up without the captains. Even before questions could be asked concerning the absent Terrestrials, the blow had been struck.

"It's those damn Martians," Hal Eaton, young time keeper, only six weeks from the Earth, had screamed as a huge Selenite struck him down with a blow of his mighty pick.

TOM, jerking his atomic pistol from its holster, knew that what young Eaton had just screamed was true. The Martians were the trouble-makers and the traitors of the solar system. Once an insolent people, who had regarded themselves as the most advanced in culture and erudition in the universe, they still, even after hundreds of years, resented the bondage in which it had been necessary to place them to curb their diabolic cunning and haughty egotism. They were forever forming secret societies, always cooking up local revolutions. Where there was trouble, one would usually find a scheming Martian.

Tom leveled the pistol at the mob of Selenites rushing at him and pressed the trigger. There was a sharp, spiteful spat. The leading Moon man disappeared in a puff of white dust, his upraised shovel clattering to the ground.

Rapidly the pistol spat and the charge broke. Even the ape-brained Selenites, who seldom knew fear, could not stand in front of that pistol which caused one of their number to evaporate into thin air every time it spoke.

From all over the compound came the sound of firing and the pounding of many feet on the hard packed earth. There were no other sounds. It was uncanny, the way these dumb, ox-like Selenites attacked, silently, ponderously, armed only with their mining tools, or lacking these, with bare hands.

From somewhere near the atmosphere plant came a rapid "pit-pat," a sound not unlike the tramp of rain across a tin roof. Someone had unlimbered the machine gun. Lucky thing! Lulled into a false sense of security by the apparent orderliness of the station, the former superintendent, a soft fool who had no business holding such a position, had ordered the gun stored away as a thing for which there would be no further need. He had lasted six months and had been transferred back to Earth, at his own request. Too bad he couldn't have stayed to taste the fruits of his asinine management.

A stone whizzed past Tom's head. The Moon men were returning. They had retreated as far as the rock pile. From around the corner of the pile they came, each carrying an armful of missiles, heaving them as they ran.

Tom jerked up his arm, leveling his gun. Before he could press the trigger a rock, flung with considerable strength, caught him flush on the elbow. The gun clattered to the baked earth.

As he dived to retrieve it, another stone struck him in the ribs and toppled him sidewise. Stones pattered all about him and as he struggled to his knees he was again bowled over.

The Moon men were almost upon him. They were rotten throwers, or they would have bagged him for good and all. They couldn't keep on making only casual hits, however. Eventually one would connect with his head and it would be lights out. For a fleeting moment, he hoped one would finish him before the lousy beggars reached him.

"Lie low, I'll clean the devils out."

Tom twisted his head as the spiteful rattle of the machine gun broke loose.

In front of the atmosphere plant, old McGregor, his white hair looking like a lion's mane, his shirt ripped to shreds, his teeth working savagely on an oversized quid of tobacco, squatted behind the gun. It seemed to quiver with the excitement of the moment as it spat out blasting death.

Over Tom's head the pellets whispered their death song and behind him he knew the charging Selenites were being blown into clouds of white ash.

Slowly he started to worm his way toward McGregor, keeping his head low, for he did not wish to intercept one of the lethal pellets.

The patter of the gun and the whisper of the speeding bullets ceased.

"All right, lad," cried old McGregor and Tom, leaping to his feet, rushed forward, forgetting his pistol, which lay where it had fallen.

When he was only a matter of a few feet from the old man, who was disengaging a magazine preparatory to slipping another into place, a Martian, followed by two Selenites rushed around the corner of the atmosphere plant.

Before Tom could warn his friend, one of the Selenites hurled a stone, which caught McGregor flush on the temple.

The old man slowly slid from his seat on the gun. The Martian and two Selenites raced for the door of the atmosphere plant.

Tom leaped after them, forgetful for the moment that he was unarmed. As he sped past old McGregor he noted that the white leonine head rested in a pool of blood and that a death pallor stamped the features.

Cursing under his breath, Tom rushed the three mutineers who were trying by brute force and awkwardness to force the locked door of the plant.

Seeing the Earth-man almost upon them, the two Selenites, trained for years to look upon the Terrestrials as their superiors and masters, momentarily forgot their rebellion and crying out in terror, threw their combined weight against the door. It splintered inward under the impact.

Tom arrived at the doorway just in time to see one of the huge brutes crush young Jacobs to the floor with a savage blow of his fist.

AT Tom's cry of rage the three whirled to face him. The faces of the two Moon men were expressionless

except for their beady eyes, which shone with a wild light; the features of the Martian were distorted into the snarl of a cornered beast.

It was then Tom realized he was unarmed. His eyes lighted upon the sword lying on the table to his left. It had been only a few hours ago he had listened to the tale of that very sword from the lips of Jacobs: It was a thrilling tale, a story of the days when men fought hand to hand.

His left hand reached out to clutch the scabbard and as he jerked the steel from its resting place, the three leaped to meet him.

With his back to the table he jabbed at the leading Selenite, to send him reeling backwards, howling with pain and clutching his belly. The point of the blade was red.

The second Moon man momentarily checked his rush and, seizing this opportunity, Tom leaped at him with the sword raised high. The brute tried to dodge, but the steel, fairly whistling through the air, caught him at the juncture of the neck and shoulder, cleaving deep. The Moon man slumped to the floor and the blade came free.

A heavy wrench, thrown by the Martian, missed Tom's head by a fraction of an inch and crashed into an array of bottles on a shelf against the wall.

"I'm coming to get you," said Tom, addressing the Martian, and the fellow snarled in hate as he backed across the room before the advance of the Terrestrial.

The remaining Selenite, still clutching his belly, staggered forward to place himself between the Earthman and the Martian. Without ado Tom methodically cut him down with a thrust to the throat.

Stepping over the prostrate body, he advanced on the Martian, who was crouched in a corner of the room.

Then, with his six arms outstretched, fingers hooked like talons about to strike, his fang-rimmed mouth opened wide, the Martian sprang to the attack.

Tom, taken by surprise, sprang back and stumbled over the dead Selenite, sprawling backwards, flat on his back, with the Martian almost on top of him.

He looked straight into the red eyes of his assailant, felt the talon-like fingers on his throat. The fanged mouth poised over his face drooled saliva on his cheek.

With all his strength, Tom brought his clenched left fist up, striking the Martian on the temple. As the grip of the fingers momentarily loosened under the impact of the blow, he threw himself sideways and rolled free of the man above him.

Both men sprang to their feet at the same instant and faced one another.

Tom lifted the sword.

"I surrender, I surrender," mouthed the Martian, fear in his eyes at the sight of the glistening blade poised to strike.

With a crooked smile on his lips, Tom brought the sword down. The Martian, his eight limbs sprawling grotesquely, sagged to the floor, his head almost severed from his body.

Tom wiped the sword and returned it to the scabbard.

Jacobs was dead. So was McGregor. There was no doubt all of the other Terrestrials, except himself, had likewise been killed.

Standing in the center of the room, he tried to determine his next course.

There were likely a few dozen Moon men and Martians still at the station. They were probably already at their work of destruction, wreaking their foolish vengeance upon the dominant Earth race that forced them to labor in the mines and forests on the several far-flung planets.

He cold-bloodedly considered the situation. First he would arm himself and routing out the last of the mutineers, slay them. Then he would remain until assistance came. Headquarters at Shaft Number One, failing to get messages through, would suspect something amiss and investigate. In a very few hours his plight would be discovered.

The atmosphere plant, even unattended, would function for a few hours, long enough, at least, for the investigating party to arrive.

In a cabinet drawer Tom found a pistol and assuring himself it was loaded, slipped it into his holster.

As he started for the door his attention was arrested by a dial. The needle was swinging crazily. He stared in amazement, then in despair. One of the fools had evidently managed to open one of the air locks in the dome and the atmosphere was rushing out into the almost airless desert. Soon the two atmospheres would be equalized and every man caught without some sort of artificial protection and oxygen generator would be killed.

There was only one thing to do. He must reach one of the cars and escape to Shaft Number Eight, ten miles distant.

As he reached the door he realized he still clutched the sword and was about to drop it, when he made a sudden decision to take it with him. Why, he didn't know. Perhaps, he told himself with a grin, Jacobs' family might like it returned if and when he got back to Earth.

Outside, a violent wind, something unknown under the great dome, caught and almost swept him off his feet. It was caused by the air rushing for the open lock.

A World of Chaos

BUCKING the air currents, which buffeted him cruelly, Tom fought his way across the yard to the car shed.

Here he found everything in disorder. Three machines, smashed and dented by some heavy tool, possibly a sledge hammer, met his eye. There had been four cars. One was missing. Evidently a party of the mutineers had smashed the three cars and escaping in the remaining one, had left one of the air locks open. There must have been a Martian or two in the party. The cow-headed Selenites didn't have the necessary intelligence to open one of the doors, let alone operate a car.

Tom cursed bitterly. In an hour the dome would be atmospherically equal to the desert outside, in which no man could live. Why did those bone-headed officials insist that every mine employ a few Martians? It would have been better to have killed off the entire race.

There was the matter of the cars, too. Why didn't the company give them light rocket planes instead? Economy again! A car cost about half of what a rocket plane would. What did the square-heads who held down swivel chairs care for the men in these ungodly outposts? Nevertheless, cars or planes, either would have been smashed. His job was to get out of the mess.

The air currents, streaming out of the dome toward the open lock, rattled the loose sheets of galvanized steel on the roof of the shed.

For a moment Tom considered trying to reach and close

the lock, but he knew, even as he thought of it, that it would prove an impossible feat. Evidently it was Lock Three, a good half mile to the east. It would take too much time to get there and even if he could reach it, he knew that the air currents would sweep him like a straw through the opening into the dread desert where the thin atmosphere made life impossible.

There remained one chance.

Stored in the cars were metal suits for both the Terrestrials and their underlings, the Martians and Moon men. The suits were equipped with a small oxygen generator. The air, as manufactured, was cooled by a miniature refrigerator, similar to the large refrigeration plant in connection with the atmosphere generators under the dome. The suit, supplied with cool air which somewhat offset the heat of the desert, served well enough for short excursions from the dome or a car, but it was doubtful if a man could cover even ten miles of burning desert sands in one of them.

While encased in one a man could neither eat nor drink. The thought of hours without water was appalling, but there was little that could be done about it. It was the one chance—if the mutineers had not thought to also destroy the suits. Luckily in a locker of one of the wrecked cars he discovered a number of the suits.

The atmosphere was already becoming rare and his heart was pounding savagely as he donned one of them and switched on the atmosphere generator.

About the suit he strapped his pistol and Jacobs' sword, and stumbled awkwardly forth, making his way to Lock Three.

Buffeted by the wind which carried with it a shower of fine stones and a cloud of dust, he proceeded through the yard, threaded his way along the streets of the location and found himself on the outskirts of the settlement, having covered about half the distance to the lock.

Behind him he heard a crash as one of the shaft houses, its guys loosened by the pressure of the wind against the tower, toppled to the ground.

Turning to watch he saw the second shaft house tumble, hurling broken boards and splinters far into the air. Sheets of corrugated iron, ripped from the roof of the buildings, gyrated across the yard.

He groaned. Working for many years with the Universal Ore Mining Company, it had become a part of his life, a very personal association. A blow at it was a blow at him. Station Number Nine would probably be completely wrecked by the terrific wind which milled in the great dome. It was wrecked as completely as it would have been by the victorious mutineers, had enough of them been left to effect the destruction.

Gallant men had died defending the station. Men he had known for years. Old McGregor, with his everlasting quid of tobacco and his lion heart. Young Jacobs, a brilliant scientist, a fine young fellow, with his old sword, the sword which now hung at Clark's side.

Eyes dimmed with tears, he faced about and plodded on.

The atmosphere machine was working well. He knew, however, that discomfort would be his in plenty before many miles had been covered. In the back of his mind lurked a persistent doubt of his ability to make those ten long miles of airless, scorching desert. But these thoughts he kept pushing back, realizing that any such doubts would only serve to minimize his chances of reaching Station Number Eight.

The wind was dying down now, but he walked slowly, knowing it would not be safe to approach the lock too soon, lest he be caught and dashed through the opening to his death.

Behind him the settlement was a mass of wreckage, only the stoutly built atmosphere plant standing.

THE terrific air currents, in a few minutes, had decreased in ferocity, and Tom deemed it safe to make his way through the lock, which lay only a short distance ahead. He moved toward it. The air currents still tugged at him, but were steadily dying down.

Reaching the lock Tom noticed that the inner portal was intact, pressed tight against the air chamber, but the outer portal was ripped from its hinges and lay a hundred yards out in the desert, deeply embedded in the sand.

For a moment Tom stood in the air chamber, pondering. If he could close the inner door and the atmosphere plant was still working, he could again bring about a suitable atmospheric condition. He suspected it would take some time to restock the huge dome with life-sustaining air. Just how long, he did not know. He was a geologist, not an engineer. While the plant manufactured the air, he could live in the suit and await the coming of a rescue party.

He grasped the door and slowly pulled it back into its proper position. It came to with a hollow sound, but there was no resounding click as the automatic bolts shot home.

Inside the helmet, Tom's face paled. The lock was broken, smashed in the course of a diabolic plot on the part of the mutineers to destroy the station. The last chance was gone. The desert was the only remaining hope.

Tom squared his shoulders. If only the desert remained, the desert it would be.

Stepping out of the air chamber, his eyes opened wide. To his left, several hundred yards distant, lying on its side, was the car which had apparently been stolen by the Martians and Selenites.

His heart thumping with excitement Tom hurried forward. Evidently something had happened. Ten to one the poor fools had forgotten that opening the two doors at the same time would be as disastrous to themselves as to those in the dome. The first blast had hurled the car and its occupants to destruction.

Upon reaching the machine he found that three of the ports had been smashed. Looking inside he saw the corpses of six Moon men and two Martians, their eyes wide with terror, their mouths stained with blood.

The hope which had risen in him at the sight of the car vanished as he noted the extent of the damage. Beside the three smashed ports, he saw that some of the machinery was also broken. A slight damage he might have repaired, and righting the car by means of jacks, used it in his enforced trip across the desert.

That hope also was now gone.

For a moment he considered remaining near or in the dome to await the coming of a rescue ship.

Little thought was needed, however, to convince him that it would be a foolhardy thing to do. If the rescue

ship did not arrive in three hours they would find his corpse inside the suit, for it was beyond human endurance to remain in one longer. If nothing else, a man would go stark, raving mad from the discomfort and the heat, which, after a time, the miniature refrigerator could not mitigate.

He must tackle the desert. There was no alternative. Perhaps he would reach Shaft Number Eight—perhaps not.

With the sand sliding under his feet and the sun, forever hanging like a huge ball of fire over the eastern horizon, beating pitilessly upon his left side, he started the long trek.

He walked in a world where no living thing existed. On every hand was white and yellow sand as dry as dust, drained long ago of any moisture the surface of the planet may once have held. Here and there lay grotesque piles of boulders. There was no life, not a single tree, or a blade of grass. There was no appreciable atmosphere, no water. It was a dead planet, chained forever to its tyrant master, the sun, its rotation on its own axis slowed down so that one heat-tortured hemisphere eternally faced the sun, while the other, frozen solid and night-ridden forever, stared out into infinite space.

Here, on the twilight belt was the only spot on the planet where man, even with the aid of all the artificial protection at his beck and call, could exist at all. Here, on the rim of the planet, where the rays of the sun were always nearly horizontal, man could live if he had at hand means of creating oxygen and a protection from the semi-vacuum of the desert.

To the left lay a seething furnace of a world, to the right, a frigid ice box of a world.

For what seemed ages, Tom tramped, stumbling, across the scorching desert. The treacherous, sliding sand, time after time, brought him to his knees. Despite the slight attraction of gravity, his progress was slow, for the suit was heavy. On earth its weight would have crushed a man flat to the ground.

He had covered approximately four miles when he saw looming a short distance ahead of him a gigantic ridge of tumbled gray rock. It was one of those occasional outcroppings which occurred on the surface of the planet.

TOM noted it with relief. It would offer shade, momentary respite from the burning rays of the sun. Fagged, he headed for the outcropping.

It seemed an interminable distance, but finally he reached it and slumped down in the shade, leaning against a huge boulder. With a sigh of thankfulness, he closed his eyes. He could not remain there long, but he meant to make the most of it.

Opening his eyes he saw two shadows moving across the sand beyond the limit of the shade. Evidently some living thing was on the ridge of rock behind him.

Getting swiftly to his feet, he faced two Martians, equipped with shining air suits.

For a split second Tom stared in surprise at the two, then his hand snapped to his holster. But his steel gloved fingers found it empty. His face blanched. Somewhere on the back trail the pistol had dropped out and now lay in the sands of the trackless desert.

The Martians had watched as his hand went back to his side. Now as he gazed at them he saw a slow, crooked smile come over their ugly faces behind the glass helmets. They knew his pistol was gone; that he was easy prey.

They carried huge clubs fashioned of wood, probably with a good chunk of lead weighing the business end, and these they now shifted to obtain a better grip as they moved toward him.

As his hand came away from the holster it struck the hilt of the sword and his fingers closed about it.

As he retreated slowly before the deliberate advance of the Martians, he jerked the blade from the scabbard.

Seeing the flash of steel and realizing that their foe was armed with some sort of a strange weapon, the two Martians leaped silently forward, five hands outstretched in the usual manner of attack, the sixth member clutching the upraised club.

Tom knew the greatest danger lay in the clubs of his opponents breaking the steel of his suit or smashing his helmet, thus robbing him of his artificial atmosphere and exposing him to the horrible vacuum of the planet.

Hampered by his awkward suit, he knew he would be unable to sidestep the blows of the club, so he resorted to different tactics.

The point of the sword flickered out, aimed straight at the wrist of the Martian who was closing in, with the club already descending. There was no sound of steel on steel, for in that atmosphereless place no sound was possible. But the aim of the Martian was deflected and the club missed its target, Tom's helmet, by a wide margin.

Tom now turned his attention to the other Martian. If he could clash the armored suit of the second attacker, he would have only one foe.

The Martian raised his club, but as the sword drove at him point first, he stepped quickly backward, out of reach of the threatening point. Following this advantage Tom lunged again and the point struck hard against the armored breast, the force of the blow knocking the Martian off balance, so that he fell sprawling to the sands.

Almost feeling his other foe close behind him ready to strike, Tom swung on his heel, but his apprehension was unfounded, for the other lay, a heap of glistening armor, in the shade of the ridge.

In some unaccountable manner the sword point, in striking the wrist to ward off the blow, had penetrated the steel. Just a small hole, perhaps, but the Martian had died as the air rushed out of the suit.

He turned quickly to the second Martian, who was struggling to his feet. With a powerful and well directed kick Tom sent him reeling, to sprawl again on his back. With sword raised high, both fists clutching the hilt, ready to put every ounce of strength into a blow calculated to smash its way through heavy steel, Tom straddled the prostrate foeman.

The Martian raised clasped hands in signal of surrender and a plea for mercy, for all the world like a dog groveling to ward off a well-deserved kick. Tom stared straight down into the warted, yellow face, upon which terror was stamped. Well might terror be there, for it was a tradition that any lesser man who raised a hand against a Terrestrial was automatically doomed to death. Seldom had mercy ever been shown.

As Tom stared down into the mottled face behind the helmet, something akin to sympathy touched his heart.

He slowly lowered the sword, touched the point gently on the Martian's helmet and then raised it and with a questioning look, pointed with it in several directions.

A flash of understanding came into the eyes of the

prostrate figure and his lips moved slowly. He pointed toward the outcropping of rock.

Watching his lips, Tom read the word, "Ship."

"It Is Not Only Mercury"

THE Martian had come from a ship. But how had he obtained a ship? For ages no Martian had been anything other than a slave, a troublesome slave, but a slave, of a greater race.

Tom pointed to the body of the dead Martian and then to his captive.

"How many more?" he formed the words with his lips.

The Martian shook his head. He pointed to himself and his dead companion and again made the sign of negation. There were apparently no others.

Tom stepped back, sword still in hand, and motioned the other to rise.

Slowly Tom followed his captive, sword held ready for instant use, across the sand and up the rocky outcropping. At the top of the ridge the Martian halted and pointed with one of his six arms.

Looking in the direction of the pointing arm, Tom saw a small rocket plane resting on the sand. Upon its silver nose was painted the ancient emblem of Mars, a red equilateral triangle inside a blue circle which, in turn, was surrounded by a yellow square.

He marveled, for that emblem had not been seen, except in the museums of the worlds, for many years.

Inside the flyer, and with the air locks closed, Tom snapped back his helmet and gulped in great breaths of the pure air.

The Martian had also removed his helmet and now the two men faced one another.

"I don't know why I let you live," said Tom, "but I did. However, one false move and it's taps for you."

"Yes, master," said the Martian in a voice humble and subservient.

"Where did you get this plane?" asked Tom.

"I and others took it and ten others from Station Number One a few hours ago."

"Station One," screamed Tom, clutching the sword. "Was there an uprising there, too?"

"At the same hour today, master, there was an uprising in every station on Mercury."

Tom took a step forward.

"Were all successful?"

"I do not know, master. All should have been. They were carefully planned."

"And the emblem of Mars?"

"Tars Kors and I painted it while we were waiting here for the arrival of our men from Station Number Nine. They should be arriving at any time now. If they do not arrive in a half hour, I am supposed to make an observation flight around the dome."

Tom smiled grimly.

"Put on your helmet," he said. "You are going to paint out your damned emblem and paint in the correct one. You needn't expect your friends from Number Nine. They are all dead. Also, if there is any flying to be done, I do it. Understand?"

The Martian nodded and donned his helmet. Under the directions of the Terrestrial he painted out the emblem of Mars and painted in its stead an emblazoned golden sun, insignia of the Earth.

Back in the flyer, always keeping a watchful eye on his captive, Tom checked over the machine. It was one of the police craft maintained by the government at Station Number One for emergency calls and was built for speed and intricate maneuvers, a fighting ship.

It was equipped with four guns, one a projector of the Allison heat ray, and the other three rapid fire guns.

Everything seemed in perfect condition.

"How did you capture these machines?" asked Tom. The police were not often caught napping and they were fighters of renown.

"Our plans were well laid, master," said the Martian blandly.

Tom snorted. They must have been well laid, he thought. According to this fellow's story, Mercury had at one stroke fallen into the hands of the Martians, who had used the stupid Moon men as mere pawns to crush the Terrestrial rule.

"What about firearms?" he asked. "How does it happen you tackled me with clubs? Are there no pistols on board?"

"It was all very confusing," explained the Martian, "Tars Kors and I were only to capture the flyer and bring it here to meet the men from Station Number Nine. Undoubtedly, if they had come, they would have brought firearms."

"And what do you fellows plan to do now that you have momentarily conquered Mercury?"

The Martian spread six claw-like hands.

"A start, master, just a start. We plan to establish independence."

"A hell of a fat chance you have," Tom informed him. "Don't you know that only a few hours will bring a flight of fighters that will wipe out every one of you."

The Martian smiled crookedly.

"But, master," he used the word with faint sarcasm, "it is not only Mercury."

Tom started.

"You scum! Do you mean—"

"Everywhere, at the same hour, the Martian struck, aided by the other races you have enslaved. On Mars, on Earth, on Venus, on every planet and satellite—"

"Enough," screamed Tom. "Another word out of you and I'll wring your filthy neck. You poor fools! You would try to conquer the masters!"

"Yes, master," said the Martian.

TOM leaped at the man and his fist, lashing out like a whip, smashed squarely into the leering, yellow, wart-covered face. The Martian spun like a top, slipping and sliding across the metal floor, to crash with a thud into a corner.

With feet spread far apart, Tom glared at the Martian.

"Get into that seat," he snarled, pointing to the pilot's chair, "and do exactly what I tell you. If you pull one boner I'll chop you to bits with this sword."

The terrified Martian scrambled out of the corner and scuttled for the seat.

"Now, listen to me," said Tom, "there are at least ten other machines that you rats have stolen. We are out to get them. We are going to wipe out as many Martians and Moon men as we can before it's all over with us. You and I are going to do that—you and I—do you understand? We are going to be avengers—"

The Martian half rose out of his seat, but Tom struck him with his open palm and he again collapsed into it.

"If we get out of this," Tom told him, "I'll swear that you stuck by me, that you still were faithful. I'll recommend you for special privileges. Do you understand?"

The Martian nodded.

"If you fail me, however, I'll finish you myself. Now start her up and get out of here. Fly straight ahead until I tell you to do something else. Remember I am right behind you at the gun controls and your life isn't worth a plugged nickel to me."

The Martian kicked the starter and the rocket motors came to life. With a roar the machine shot forward, taking off easily and smoothly.

In a few minutes the shining dome of Station Number Eight loomed on the horizon.

As the flyer swept down over the dome, Tom saw a plane resting before one of the locks. Close beside it stood a car, which was disgorging figures clad in metal suits. Another car lumbered out of the air locks and made for the plane, upon which was emblazoned the Martian symbol. The victors were transporting their forces to the stolen plane.

Swiftly he spun a wheel and through the range finders saw the plane outlined against the cross-hairs. But before he could touch the lever which released the heat ray, the floor tilted sickeningly beneath his feet.

Whirling from the gun controls he leaped at the Martian.

"Put her up," he shouted. When his command was not obeyed he struck a single blow, knocking the pilot out of the seat.

Through the observation window he glimpsed the ground rushing up at him. The sturdy little ship groaned in every joint as he put it up sharply, missing the ground by only a few feet. The rocket exhausts roared louder as the ship charged upward at a tremendous speed.

The Martian lay huddled at the foot of a locker, dead to the world. Tom had not pulled the punch which had spun the helpless one out of the pilot's chair.

At a mile altitude Tom leveled off the ship and nosed it slightly downward. Far below him the Martian ship was taking off. Just above the horizon he glimpsed the dome of Station Nine, which he had quitted a few hours before.

Tom again put the ship up. There was no sense in attempting to fight. He could not pilot the machine and handle the guns at the same time.

He cursed the silent figure on the floor. If the blasted fool had only stuck to his job. Nevertheless, one could hardly blame the fellow. It wasn't natural to fight your own. Probably, under similar circumstances, he would have done the same.

Through a port he saw the Martian plane far behind, following rapidly. The emblem of the Earth on the nose of his machine must have been sighted.

He went back to the controls and advanced the little plane to top speed. With his lighter load he might be able to outdistance the Martian machine.

Over the horizon loomed the dome of Station Seven and a few minutes later Station Six swung into view. Stations Five and Four were past and the Martian plane was falling far behind.

Another dome appeared ahead of the racing flyer. Above it hung a huge silver ship, which Tom recognized as the transport from Station One.

As he watched, the dome, lying directly beneath the transport, crumbled, falling in upon itself, a cloud of dust rising slowly.

The Martians, having captured the transport, were using the huge heat ray machine aboard to destroy the domes. It seemed their purpose to destroy every work of man on the planet.

Red rage rising in him, Tom leaped to the gun controls, moved the ray nozzle to point straight down, shoved the release lever over and locked it in position.

BACK at the pilot controls he threw the ship down in a long dive, straight over the transport. Passing directly over the ship the ray would slice it in two—halt further destruction of the domes. The ray machines on the smaller planes, he knew, were not large enough to touch the huge quartz structures.

With the speed indicator pressed against the pin, the machine flashed down, the ray streaming beneath it.

Tom brought the plane to an even keel and almost as the transport disappeared beneath the machine, he heard a faint click.

Beside the gun controls stood the Martian, his hand still upon the ray lever. He supported himself by gripping the iron railing which ran around the control board. The effects of the blow had not totally left him. He was evidently still dizzy, but the half smile on his repulsive features told Tom he had reached the controls in time to save the transport.

For a moment the two stood eye to eye, then Tom's hand went back to the hilt of the sword and jerked the blade free. There was not a word spoken.

At the sight of the blade in Tom's hand, the Martian seemed to come to life. He leaped away from the gun control and ran toward the end of the ship. The Terrestrial dived after him.

The ship tilted far to one side and both of the men lost their balance on the sloping floor. Tom, still clutching the sword, crashed solidly against the side of the hull.

One of the locker doors on the opposite side swung open and with a clatter a varied assortment of tools hit and slid across the floor.

Struggling to his feet, Tom worked his way up the slanting floor to the controls. Out of the corner of his eye he caught sight of the Martian huddled in one corner of the cabin.

With his outstretched fingers almost touching the control lever, Tom turned again to look at the Martian.

What he saw brought a scream from his lips. On his knees before one of the ports, the Martian was aiming a heavy wrench at the quartz. If that quartz were broken it meant death for both of them. With a rush the air would leave the flier and both of them would fall in their tracks.

At the sound of the scream, the Martian turned his head and his aim was deflected. The wrench brought up with a metallic crash against the hull, missing the port by a scant inch.

Quickly the Martian poised the wrench again and as he did so Tom hurled the sword at him. End over end the weapon flew. Its point caught the man of Mars at the base of the skull and drove deep. The Martian rolled to one end and the wrench clattered to the plates of the floor.

Tom stared. He had not thought he would kill the man by merely throwing the weapon. It had been his intention to thwart the other in his act and then to settle with him in a hand-to-hand encounter. After all, it didn't matter. Sooner or later one of them would have had to die. There was not room on the ship for both of them.

He fought his way up the inclining floor to the controls. The ship, he saw, had nosed upward and was tearing spaceward. He brought it on even keel and turned it down.

Far below him, he saw the surface of Mercury. He could plainly see the nine domed stations, but only six of the domes remained intact. To his right he could see the edge of the hot side of the planet, where molten ores bubbled eternally and lakes of melted lead sent up fumes that mingled with the low-lying gases that hung over the entire Sunward half of the planet.

Between the twilight belt and this seething cauldron ran a low lava ridge, which rose at varying heights over the level of the molten sea. At places, Tom could see, unusual activity in the sluggish liquid metal had sent streams of it coursing out into the twilight belt, where it ran slowly for several miles before congealing. He suspected that here lay the secret of the rocky ridges, beside which he had met the two Martians.

To his left he saw the stark frigidness of the cold side of the planet. There, chained forever as ice and frost, was the last vestige of the atmosphere and water of Mercury.

He glanced down toward the region where the domes lay and saw that ships were rapidly taking off from Station Three. The huge transport, slower in motion than the smaller planes, was far below him and to the right.

He grinned grimly. The planes were to attack him, and the transport, much too valuable for the Martians and Selenites to lose, was moving out of the way of chance rays.

He would see about that. It was plainly up to him to destroy the transport. It was too dangerous to leave it in the hands of the mutineers. With it, they could leave Mercury. It was the only space-going ship on the planet. It had arrived only a few hours before with supplies for the stations, consisting largely of explosives to be used in the mines. He wondered if it had been unloaded.

The planes were climbing swiftly toward him. He could see the Martian symbol, painted on the bow of the foremost, flashing in the sunlight. Behind the first plane trailed at least a dozen others.

They had gained too great an altitude for him now to attack the transport. He would have to fight his way through. He realized he must be cautious. He was fairly familiar with the operation of a ship, and in that one thing he had an advantage over the Martians and Selenites, who were rank amateurs. In all other things the enemy had the advantage. They were greater in number and each ship carried a gunner.

Sharply he swung the ship up and locked the controls. Leaving the pilot's chair, he moved to the gun controls. Here he moved the ray nozzle to point slightly forward and down. The three rapid fire guns he aimed straight ahead and to each control lever tied a length of copper wire. He shoved the ray control clear over and locked it in position, and trailing the copper wires in his hand went back to the pilot's seat.

Carefully he arranged the wires where he could grasp them at a second's notice and then in a long loop turned the plane over and plunged down.

To the thirteen planes pursuing him had been added several others. Only then did Tom realize the true odds against him. With the vicious heat ray streaming from the nozzle under the machine he dived with reckless speed at the attackers. Like a plummet he dropped toward the lead plane. He could plainly see one of the rapid fire guns mounted on it quivering and knew that he was under fire. So far, however, none of the atomic pellets had found their mark and he doubted if they would at that distance. The distance was great even for an experienced gunner and the Martians were far from that.

Half a mile above the lead plane, he leveled off and went up in a great zoom to gain altitude. On altitude everything depended. So long as he could keep above his attackers, all was well; once he fell below them he was at their mercy.

Beneath him the lead plane, caught in the Allison ray, split in two and plunged toward the surface, a mass of smoking wreckage. Another plane, its right wing seared by the ray, tottered for a moment in midair and then sideslipped, falling faster and faster, defying all the frantic efforts of its pilot to right it.

With the rocket exhaust roaring like mad, Tom's plane swung over on its back and nosed down again. Almost directly beneath him the Terrestrial saw three of the mutineers' planes and jerked one of the copper wires. One of the rapid fire guns clattered viciously and one of the planes disappeared in a puff of white smoke. Tom's hand jerked at a control and the plane protested with a groan of metal at a slight change in direction. Another plane, however, brought directly beneath the nose of the Terrestrial's ship, also disappeared in a white cloud that slowly sifted downward.

As Tom leveled off, one of the Martian planes turned over on its back and from its under side a ray sliced upward, but missed the Terrestrial ship by a wide margin.

Off to the right and just over the edge of the ridge which separated the twilight belt from the hot side of the planet, Tom saw the transport hanging in all its silver bulkiness. There was not a single ship between it and him! With a catch in his breath he flung his ship down in a long dive. His heart sang exultantly as the machine screamed down on the transport.

Those on the great ship must have noticed his maneuver, for the huge transport stirred, swinging slowly around in an attempt to escape. It was not built, however, for quick getaway. It had not a single chance to elude the lightning flier.

Not more than a hundred feet above it, Tom drove his plane, and as he screamed over it, he swung back hard on the control lever and the little ship shrieked upward. Beneath him the transport, cleanly rayed, split in two, dropped toward the molten sea.

Tilting the machine Tom stared down through a side observation port. He gasped in amazement and then held his breath.

Where the transport had fallen rose a great geyser of molten ore and rock. Slowly a part of the great ridge toppled and fell. Like a monstrous tongue of flame the molten geyser curled over and poured downward, while the mighty sea of sluggish liquid rushed for the hole

blown in the ridge which separated the twilight belt from the hot side of the planet. Great clouds of heavy gases rolled upward, blotting out the scene below. The planes driven by the Martians, caught in the terrible blast, were tossed about like leaves in an autumn gale and out of control, were falling back to the surface. The only thing that had saved him from a similar fate, Tom knew, was his hasty break for altitude after raying the transport.

The transport had carried a consignment of explosives, he remembered, and had arrived only a few hours before the general mutiny. Evidently it had not been unloaded and had exploded when the disabled ship struck the bubbling sea.

At three miles he leveled off and stared down at the surface of the twilight belt. Like a great river the molten metal was pouring through the break in the wall and was rapidly spreading over the unprotected region. Not a single plane was in the air.

As he watched, the advancing flood struck Station Number Three and seemed to rear up to surge over it. Even from his great height he saw pitifully small figures running for their lives before the great wave. He knew that, hampered by space suits, they could not run far before being overtaken.

Part of the wave seemed to be congealing, but even as it did so, more of the molten stream poured over it and rushed on. One tongue gradually pushed its way across the belt and stopped only a few miles short of the cold side of the planet, frozen into a solid mass by the frigid conditions on that side of Mercury.

Tom noticed that the congealing of the metal stream was slowly backing up the outpouring of the liquid through the break in the wall. In a few hours a vast new barrier would be thrown up between the twilight belt and the bubbling ocean, but buried beneath that new barrier would be the failure of a rebellion on Mercury. The Terrestrial had proven himself master again.

A blue light flashed on the instrument board. He reached over and plugged in a connection. He spoke into a small microphone.

"Tom Clark, geologist of the Universal Ore Mining Company, stationed on Mercury, ready to receive," he said.

"Commander James Smith, of the Earth vessel, *Star Ogre*, speaking," replied a faint voice, "now running near orbit of Venus. Have five ships to put down uprising on Mercury. Hold on!"

"Send back four of your ships," said Tom. "Only one is needed to take off survivors. The mutiny is suppressed."

"How many survivors?" the voice asked laconically.

"Only one," said Tom, "and that's me."

THE END.

For the April Issue

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AND OTHERS IN THE APRIL 1932 WONDER STORIES
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COMING!!

"The Brood of Helios"

The Time Stream

By JOHN TAINE

(Illustration by Paul)

When the nine suns sank below the ocean, the planet seemed strangely familiar. Of the nine, one greatly outshone the others.

THE TIME STREAM

What Has Gone Before

A GROUP of science enthusiasts in the year 1906, in San Francisco, try an experiment in throwing themselves back in the stream of time to a previous existence of the human race on another solar system before it came to earth. They find themselves on a desert filled with human bones, and realize that this was the result of a war which had decimated the race. They know that they have been sent back in time to prevent a marriage, which if consummated will wreck the human race. They suddenly return to 1906 and realize that they each have two selves one of which exists in that dim past and the other in the 1906 present.

Several of the men, visiting a young woman friend, a Cheryl Ainsworth, are again thrown back into the past, and they find themselves on a world called Eos, on which the condemned marriage is about to take place. Eos is a world with five suns and five pillars descending on a great ball which supplies the race with atomic energy. Cheryl is one of the inhabitants of Eos, and it is her marriage that the Councillors of Eos are trying to prevent, for if it's consummated, against the Rule of Reason that prevails in Eos, a beast in human nature will be unleashed, and destroy the race. The Councillors know of a tradition that states that ruin to Eos can be averted if they will "Discover the Secret of the Five Suns," and some of the Councillors often slip into the time stream from Eos to a still previous existence of the race, to find the secret.

The Councillors are now ready to hear the evidence for and against Cheryl's being united to her lover Beckford against all the scientific records of their compatibility.

Dill tells how, in a previous existence of the race on a world far removed from Eos, all of the race except 1400 scientists who had deserted it, were ruled scientifically to prevent the race from perishing of hunger. Savadan who had followed Dill into the time stream tells how, after the destruction, the scientists came out of their caves and after many generations prepared to leave that world for another. They left the secret of their discoveries, notably of the nature of gravitation inscribed on a great number of monuments.

Herron who followed Savadon ages later tried to discover the secret of the inscriptions. He wanted to learn how the scientists had crossed space from their own world to Eos. Culman tells how the scientists landed on Eos and transformed the jungle into a paradise, harnessing five suns to give them an inexhaustible store of energy.

Despite the warning contained in these stories, Cheryl refuses to give up her marriage to Beckford.

Then all of them are projected back to earth. They all go to Culman's quarters where on April 15, 1906, Culman writes for them a projection of the future of the race to occur before 1916. His manuscript is sealed in a cylinder to be opened in 1931.

Then most of the time travelers fall suddenly into a cataleptic rigor. Those who remain watch over them.

Finally all of them return to Eos. They have been in the time stream for half a generation. Cheryl's daughter has grown up and is called the Singing Flame of love by the Eosians who have yielded to her spell. The Council of Eos has cut off the Undying Fire from the five suns, so as the Eosians are listening to the seductions of Cheryl's daughter they see that the suns are beginning to fail upon Eos. The brute has at last been set loose in Eos and the people are divided into two factions. The gravitational balance of the Eosian worlds is destroyed and Eos is plunged into chaos. The members of the council are thrown into the time stream where they search frantically for each other. In the time stream they get visions of the other worlds inhabited by the race between the time of their exodus from Eos and their inhabiting of the earth.

Now Go on With the Story

NOR, until the very last, were we more successful in our search for Dill and Cheryl's daughter. Then, having by an accident reascended the time stream almost to the annihilation of Eos, we saw reflected upon its glassy surface the image of a sandy beach white with the pulsing foam of some vast ocean.

That water was the sea of a planet of which we had no knowledge; our Eosian astronomy, as we remembered it, recorded no planet with nine rising and setting suns. Yet, when the nine suns sank below the ocean and the stars came out the planet seemed strangely familiar. For the heavens were as a grander pattern of those which dimly shine above the shadow life. If indeed that planet was this place of shadows eons ago, the nine suns which made its heavens a glory have dwindled to one. The others have passed on into the depths of space. Indeed, of the nine, one greatly outshone the others. It may be that even then the eight smaller suns were receding from the planet. Or again, the eight may have been sweeping on past the planet in their vaster orbit into the unknown; and we merely chanced to see their cluster at its closest approach to the ninth sun which still remains.

We seemed to be regarding the waste of blue waters through thick glass. It was a true reflection on the time stream. Behind us lay a forest; before us, the tumultuous sea.

WE BRING now to our readers, the last chapters of this marvelous novel which comes to a glorious climax by the author's prophetic vision of the human race.

Science does offer many unexplainable incidents of what is called "second sight." Many people are authentically recorded as having seen in a vision a scene of a place that is strange to them. Years later they will in the course of their travels find themselves in the identical spot of their vision. It is too early for us to ascertain what these things mean, whether by some concatenation of circumstances two points of the time stream meet for them and they "see the future," or whether the whole thing is a hoax.

But whatever its nature it offers food for thought for our most profound scientists, and opportunities galore for our imaginative writers such as the versatile John Taine.

For long we watched the nine white discs creeping slowly across the heavens, and high above the wilderness of foam-whitened sands. The suns were on their downward course. At length, as the foam reddened with the setting of four suns, we saw an old man emerge from among the trees. He tottered down to the edge of the foam. There he stood, staring wistfully out over the heaving waters at the last five suns, which still hung low above the horizon. It was Dill.

Presently a crowd of young men and women trooped from the forest and stood gazing with Dill at the swiftly sinking suns. They all had various fruits in their hands, which they ate as they watched the sunsets. In the failing light we scanned their faces. Then we understood Dill's wistfulness for Eos. For all those faces, though kind and gentle, were unintelligent. The sparks of reason were not yet kindled in the minds of this primitive people. Their age—long ascent toward the light was still in the future. Yet they were happy.

As we watched, a slow-moving sea animal lurched down through the crowd toward the foam. They made way for it with smiles and gestures of playful affection. Dill saw their happiness, and his blood lust rose. Their simple contentment maddened him whose happiness was a shadow of the past. He picked up a heavy stone and, dropping it, crushed the harmless creature's head.

The half-eaten fruits fell to the sands. Those hapless children of time gazed in wondering horror at the white haired slayer. Then they turned and fled to the shelter of the forest, leaving Dill alone with his murder. And as the last of the five suns sank beneath the sea, we remembered the first stone which had been hurled in Eos, and wondered what marks the second, and the third, and all the millions to come after them would find in this place of simple, unreasoning happiness.

Twilight swiftly fell; and Dill, turning from the sea, crept into the forest.

The darkness came down. Long after the stars rushed out, we saw in their dim light a lonely woman steal from the shelter of the trees and walk slowly along the beach. Her thick black hair hung loosely about her body, brushing against her knees as she walked. It was Cheryl's daughter, the Singing Flame.

She appeared to be searching intently for something which she had lost among the pebbles. Presently she bent over and picked up a small pebble. In the starlight I could not clearly see its color, but imagined it was a pale golden. She rubbed the pebble on her hair.

"Oh, if I could but help her," Sylvester thought. "I might yet undo the terrible wrong I have done her . . . . Not that way, girl, not that way! See—hold the pebble thus—Now pick up the green pebble at your feet—Not that one; the duller, just beyond it. Press the yellow pebble against your hair . . . . Now, quickly with the green one break it!"

She pressed the yellow pebble against her hair. The other she held before her at arm's length, and stood motionless, lost in doubt. She had forgotten . . . . One spark of the undying fire and she might have kindled all the sands of the shore into instant life. But the simple secret eluded her memory and nature mocked her.

The green stone fell from her hand. She did not pick it up. Listlessly she rubbed the other against her hair. It sparked, and she started in glad wonder, dreaming that she had remembered. And the sudden blue spark gave me my direction in the time stream which I had lost.

"Watch the stone in her hand," was the message of my mind to my companions. "Follow me if it sparks again. We shall find our way into the shadow life."

Again the Singing Flame rubbed the yellow stone against her hair. Holding it before her eyes she slowly brought a finger near it. The bright, eager flash of false knowledge in her brown eyes is the last memory which I retain of any child of Eos. She vanished with the spark. For in the instant we recovered our direction in time, she sank into the black past of unfathomable ages.

CHAPTER XXVIII

A Dream Fulfilled

FOR some seconds I lay staring up at the ceiling. How had I come to this place, and where had I been? A sharp sense of impending disaster caused me to throw off the heavy coverings and leap to my feet.

JOHN TAINE

"Better lie down again for a few moments." It was Beckford's voice.

"How did I get here? What has happened?"

"You are in Culman's rooms. I don't know how you and the others got here. They are still lying unconscious, as you can see for yourself. Evidently you all have had what I had. As soon as I recovered I came to look after you. It is now ten minutes past five in the morning."

Then I began to remember. We must again be lost in the shadow life. We had slipped from this room into the time stream on Monday evening. Culman, Palgrave, Herron, Savadan, Sylvester and Ducasse were still in the stream, but apparently about to emerge. Their coverings stirred uneasily.

"What day is it?" I asked Beckford.

"Wednesday, April the eighteenth, 1906. I found you all in this state yesterday afternoon when the landlord let me in. Palgrave's office girl told me about him, and I guessed where to look. I made a very quick recovery. So did Cheryl."

"Do you remember anything?"

"What do you mean?"

"Of what you saw when you were away?"

"Away where?" he asked, alarm beginning to show in his eyes.

"In Eos."

"Look here, Smith, you lie down again until you get over it. Take another nap till the doctor comes."

Convinced that he remembered nothing, I lay down to pacify him. As he bent over me to rearrange the blankets, I noted with a shock of surprise that his hair was not white, but brown. Also he was a young man again. Then, on reflecting, I realized that this was but natural. His journeyings in the time stream had erased not only his mind, but the very marks of his age and sufferings . . . . Again the sense of imminent peril set all my nerves on edge. And then it happened.

A harsh, grinding thunder rumbled up through the floor, and there was a sudden nauseating jar. Instantly my companions and I were on our feet.

"Outside!" Beckford shouted, bolting for the door.

But before we reached it we were hurled back on our blankets. The San Francisco earthquake was upon us. The books shot from their shelves, the window panes burst in with a crash of shattered glass; and as we got to our feet again, a cascade of bricks from the falling chimney thundered down on the blankets where three seconds before we had been helplessly rolling. Then the angry shaking ceased as suddenly as it had begun.

We looked into each other's faces but said nothing. We felt that it was not over. With tenfold fury it began again. Fixing my eyes on the corner of the ceiling I swore that I would die without a yell. Again we were thrown down and rolled helplessly on the floor. But somehow I managed to keep my eyes on that corner of the ceiling. It squeezed in from a right angle to an acute. Then it suddenly opened wide to an obtuse angle. But the house was well built, and the walls held.

Not one of us made a sound. We were too scared.

With curious distinctness I remembered a passage in one of Livingstone's narratives in which he asserts that fear so paralyzes victims of beasts of prey that after the first shock they feel no pain. The whole house might have fallen on me and I should have felt nothing and cared less.

Gradually the horrible jarring noise died down. A few seconds of gentle, oily motion, and it all ceased abruptly. It was over.

"Well?" Ducasse remarked.

"Well?" Palgrave countered.

"We're alive," Culman announced.

"How do you know?"

"Because I feel seasick."

"We had better clear out before the next," Beckford advised, kicking the lower panels out of the jammed door. "Come on, crawl through."

Before following, I glanced out of the window. The clock on the tower of St. Mary's church had stopped at thirteen minutes past five.

"Hullo!" I cried, "there's a fire. It must be down on the waterfront."

Culman turned back a moment. "Yes," he said. "And I'll bet there are others. Cheerful sort of life we've drifted into. I wish we had stayed on that beach."

IN OUR scramble down stairs I remembered the last time we had descended those stairs just after witnessing the sealing of the brass cylinder.

"Is this earthquake what you saw when you made your experiment?"

"What experiment?" he asked. He was still dazed.

"The one Cheryl asked you to make."

He remembered when we reached the sidewalk.

"Thank God, no!" he ejaculated.

"Why so fervent about it?"

"Because the consequences of this quake will certainly be deep enough to leave some reflection on the time stream. You may bet we haven't seen all of it. And I saw not the slightest shadow of anything even faintly resembling this on the time stream. There may be a great flare up before this thing ends. I shouldn't wonder if the water mains are snapped. Hullo—there are two more fires—and there's another."

In the still, greyish morning air we counted six fires in the business district between us and the waterfront. And it was then less than five minutes after the earthquake. The clang of firebells and the clatter of the engines suddenly broke the unearthly stillness. Silent groups in their night clothes hastily reëntered their houses. In that part of the City at least there were no illusions. Already the people were collecting their valuables.

"But why," I persisted, as we hastened down California Street toward the Bay, "why are you so glad that you saw nothing of this on your journey into the future?"

"Because," he replied thoughtfully, "it is now a little better than an even chance that what I did see was a false reflection. I began to have hopes that it was all an illusion. It is one chance in two, now, or perhaps even a little better, that the world is to be spared what I saw."

An ambulance dashed along Dupont Street, and then another. Palgrave turned back.

"I say, fellows," he said, "if it's as bad as all this I had better be reporting at the Emergency Hospital. I'm not much on surgery, but they may need me for the shock cases. Here, Smith," he threw me his keys, "clean out my record files at the office and cache the stuff somewhere. There's about a thousand dollars in bills in the safe." He gave me the combination and continued rapidly. "See that Miss Blake (the office girl) gets three hundred to tide her over."

"Hold on," Ducasse cried, as Palgrave started on a run down Third. "When and where shall we meet?"

"Next Sunday, on the Berkeley Campus, under the Le Conte Oak," he flung back over his shoulder. "We're going to be cleaned out. So long."

"I must go and see if Cheryl's safe," Beckford said "She came over to look after us. She's at the Grand." He ran after Palgrave.

On turning into Montgomery Street we saw a fire engine panting and fuming over a corner hydrant. The fire captain was in the middle of the street cursing or crying—I could not make out which. His men were smashing into a fierce red blaze in a fire insurance office across the way.

"What's up?" Culman called to the Captain.

"General alarm, no water. The Chief's killed."

"Chief Sullivan?"

"Who in hell else? Come out of that you —— —— fools!" he bawled at his men. "What are you trying to do? Spit on it?"

We left him to his troubles and hurried about our business. My laboratory was a messy wreck, but by some freak the spilled chemicals had started no fuss. We gathered together all the papers of value and ran on to Palgrave's.

"Somebody's beaten us," Herron said. "The door's open. If it's a looter, I'll plug him."

He drew his revolver—which he always carried on his professional visits to the underworld, and which seldom left his hip pocket—and entered, we closely following.

"Oh!" cried a startled voice.

Miss Blake sprang to her feet from her chair in front of the open files. All about her the floor was a litter of papers. On one side a neat little pile stood by itself. Her hair was in a loose knot on the back of her neck, her shoes were unbuttoned, and evidently she had on no stockings.

"Oh," she said again, but more confidently. "It's you. Help me sort these. Keep the case records—like this one—and throw away the bills and receipts. There are too many of them to sort out now. How is Dr. Palgrave?"

"Better," Herron answered. "He's gone to the Emergency Hospital. Good girl." He patted her shoulder. "How did you get here so soon?"

"Ran. I'm going over to my aunt's at Berkeley. Do you smell anything?"

"Scorching paint. We'd better hurry. Clear out the safe, Smith. You've got everything? Then we'd better run for it. The flames will be up the elevator shaft in a moment and we shall be cut off."

Safely on the sidewalk we had a hurried consultation over our next move. Herron said he would have to report at once to his paper, not that he expected any assignment on such a day, but as a matter of principle.

"Mr. Savadan," he said, "will you escort Miss Blake over to Berkeley, and wait there until next Sunday for us? If nothing happens to prevent us, we shall meet you under the Le Conte oak about noon. Here's twenty dollars—no, take it as a loan—for expenses. Smith, give Miss Blake her advance salary as Palgrave wished."

I PEELED off six fifties and handed them over to her. She insisted upon giving me a receipt. Altogether she was a remarkably cool-headed young woman. Taking charge of Savadan, she immediately rushed him off to catch the ferry.

"Suppose we agree to meet in half an hour at Holst's if your paper doesn't need you," Sylvester suggested.

It was agreed, and we parted. On reaching Holst's we found John outside locking up.

"Well, boys," he said in his quiet way, "this is the end of San Francisco. They may build another city here, but it won't be San Francisco. Come in and have one on the house?"

He unlocked the doors and we followed him into the wreckage. After a prolonged search he found an unbroken magnum of champagne and four glasses. He filled up the large glasses brimming full.

"To the best city on earth," he said, raising his glass. He drank, and smashed his glass against the ruined back bar. We too added our mites to the litter of broken glass and wrecked bottles.

"I suppose you know the Colonel was killed?" John remarked as he locked up again. "His lodgings tumbled together like a house of cards."

"Are you sure he's dead?" Culman asked.

"Sure. I saw the firemen digging out his body. It was pretty badly smashed."

We said nothing, and John dropped the subject. Herron rejoined us with the news that the three leading papers were getting out a joint edition, and that he would not be needed. Also he reported the rapid spread of the fire in the Mission and South of Market. There was no water, he said, beyond what was left in a few out-of-the-way cisterns—not enough to extinguish a smoking chicken coop.

"Let us go up on Nob Hill and watch the fire," John suggested. "We may as well enjoy the show. It will cost us nothing," he added with a laugh.

As a matter of fact it had already cost him the savings of twenty years, although he said nothing about it. We learned long after the fire was cold that John's modest investment—three laborers' cottages—had gone up early, and that he knew he was ruined when he invited us to drink with him. His property was insured; but he never collected one cent of his insurance. The company in which he was insured produced an obscure earthquake clause which nobody had ever paid any attention to, because it was supposed to have reference only to Central America.

John's spirit of good sportsmanship in the teeth of disaster was characteristic of all the San Francisco people. Not once in the four days of fire, hunger, ashes and thirst did we hear a whine.

From the grinning negro gentleman whom we encountered carrying his pet tomcat and green parrot in the latter's gilded cage, to the scholarly rector of Grace Church who stood with us about nine o'clock of the first night watching the flames creep steadily nearer his church and finally overpower it, all sorts and conditions of men were ruined, generous and lighthearted. There was not a long face in the lot. What food the more provident had carried away with them was freely shared among all. Without exception the people were worthy of their City and of its great end.

"How infinitely better that it should go up in flames like this," Sylvester said, "than that all the good and delightfully bad things in it should be slowly smothered to death by earnest, high souled, stupid reformers."

All through the glare and din we slept but little during the four days. On the night of the second day we shared the Octavia Street Park with a few hundreds as footsore as ourselves, but we hardly dozed. Besides, we had no desire for sleep. The one crumpled roseleaf was the continual crashing of the dynamite explosions which told of the plucky but hopeless fight which the firemen were putting up as they retreated before the marching flames. After two days of it the constant racket began to get on our nerves, and we longed for a quiet nook on Robinson Crusoe's island. Nevertheless we, like thousands of others, decided to see it through to the end. In fact nothing short of a machine gun could have chased us out.

We shared the last stand of the firefighters at Van Ness Avenue. If they could not stop the flames there, with all the advantage of a straightaway a hundred feet broad from Market to the Bay, they might as well give up and acknowledge themselves beaten. But they did stop the flames; and Cheryl's vivid dream was fulfilled to its least detail.

"Now for a cool spot with grass on it under the trees somewhere," Herron said, as we turned down Market Street and gingerly picked our way through the hot bricks.

John, unable to tear himself away from his love in her time of trouble, decided not to accompany us. He turned toward Twin Peaks and walked slowly off by himself. Passing the bank where our precious brass cylinder was deposited, we noted with concern the great flakes of stone which had fallen from the entrance to the vaults, and the clean sweep which the flames had made of everything above the street level, leaving only a charred skeleton. But, as we learned afterwards, the vaults although done to a turn, still held their contents intact.

On reaching the Ferry Building we found another token of the general thoughtfulness of people in time of distress. Everywhere large water barrels invited the thirsty to drink.

"I revise my judgment of this shadow life," Culman said, when at last he had a skinful. "It's a pretty decent sort of existence after all."

"I second that," said Ducasse. He had just returned from a visit to the ticket office. "Free transportation to all points is the order. So I still have my thirty-five cents and no end of philosophy with which to begin a new life."

We boarded a Key Route boat. For perhaps the first time in our lives we estimated comfortable upholstery at its true value. There were very few aboard. The great exodus had taken place much earlier. Consequently each of us had all the cushions he could possibly sprawl over.

"What shall I do with my life?" Herron inquired of

the white ceiling. He seemed to have been converted—in the technical sense.

"Live it," Ducasse tersely suggested.

"So long as it is a life," Herron retorted, "I must. So your advice is tautological. But it isn't a life in that way. It is only the shadow of an existence."

"Then you believe in your adventure?" Ducasse asked.

"Absolutely. So do you. And so does Culman. Every last one of us knows beyond all argument that our experiences in Eos were the truth. This life for us at least is only a vivid dream. Nevertheless we have to live it until we awake—or sink to the bottom of the flood."

CHAPTER XXIX

An Explanation

NONE of us challenged his statement. Presently Culman spoke.

"My mind is made up," he announced. "The one hope of this world is science. I shall devote what brains I have to the advancement of subatomic physics, on the chance of adding my mite to the solution of the great problem."

"Which is?" I asked.

"The subjugation of brute nature. Poets and other dreamers in this shadow life look upon nature as man's kindly friend. She is the archdevil. And until mankind clubs her brutal forces into abject submission he will be tormented all his days by wars and untamed lusts, by hunger and hatred and disease."

"And you soberly assert that science has made people happier than they were?" Ducasse mocked. Like all who have leaned heavily upon the humanities he had a distrust of science. "What about sweatshops? And child labor? And battleships, and your efficient, scientific machine guns? All these things came in with science. What about them?"

"Well, what about them? If I force you to swallow strychnine, who is guilty of murder? I suppose you would say they ought to hang the strychnine, or at least smash the bottle. And so in the case of misapplied science. Would you take a hundred dollar watch to a drunken idiot to be repaired? And would you entrust the care of high explosives to a paranoiac moron whose righteous contempt for all science is equalled only by his perverted skill in the mediaeval technique of legal hairsplitting? Don't blame the dynamite for making a noise when some humanitarian statesman pounds it with the sledge hammers of his eloquence. It really cannot help itself."

Perceiving that Culman was mounted on his fiercest warhorse, Ducasse diplomatically stepped aside.

"But what do you personally mean to do to hasten the world's golden age?"

"I shall go to Berlin as soon as I can convert all my assets into bonds. My patent is worth a small fortune to some enterprising business man. After finishing up there I shall go on to England."

"Cambridge, of course?" Sylvested asked.

"Of course. The Cavendish Laboratory is my aim. If only I can learn enough to be admitted there as a research student, I may be able to do something not utterly futile."

"Then you may find me waiting for you," Sylvester said. "I shall sell my ranch and live on my income. Then I shall take up my studies in physics where I left them three years ago at Cambridge."

It was the first time we had ever heard him mention his university career. He continued rapidly outlining his plans.

"Probably neither Culman nor I will discover the process for transforming matter directly into usable energy. But his mechanical ingenuity and my theoretical training might crystallize into ideas of value. I do not look for a solution of this problem within three-quarters of a century. Yet, the tremendous rate at which scientific knowledge is increasing nowadays ought, within a century, to bring the end within our reach.

"Then this world will see the last of incessant labor to beat back poverty and keep body and soul together in a life which, to a majority, is not worth the living. That will be the first step toward civilizing our race. After that the rest will be easier. What are you going to do, Smith?"

"Give up chemistry as my main line," I replied, "and take a course in the Galton Laboratories in London. Then I shall turn what brains I have to the scientific study of eugenics."

"Where will you get the money?" Herron demanded.

"From my parents."

"What, have you parents too? Lord, I wish I knew something else besides slum reporting. Where did you steal your patents?"

"Out of nature's vest pocket. I was keeping my good luck to spring on you as a surprise at our next meeting at Holst's," I confessed. "But as Herr Holst's café is now a colorless, tasteless, odorless gas somewhere in the infinite blue, I may as well drop my bomb now. The Baden people gave me fifty thousand dollars for all my rights in some new black dyes which I invented about a year ago. At five per cent that will net me five hundred pounds in England. For a strict bachelor with scientific tastes that income is wealth."

"Why didn't you sell your stuff here, instead of peddling it to Germany?"

"Because there were no buyers I couldn't give my formulas away either here or in England. Now, Bill, what's your ambition?"

HE LAUGHED, and then grew serious.

"The first chance that offers I shall take a job as a war correspondent. My father has a pull with one of the big New York dailies, and he can get me a fair trial. After that it will be up to me. As a war correspondent I shall be unique. For I intend to tell the truth about war, the whole truth, and nothing but the truth. So help me God."

"Will you marry?" Culman asked quietly.

"Yes. I intend to marry Miss Blake."

"Rather sudden, isn't it?" Culman asked doubtfully.

"Very. But there was something so attractive about her bare feet the other morning that I must have them."

We had reached Berkeley, and were walking toward the Campus.

"Bare feet nothing," Sylvester exclaimed. "She had on boots."

"'Shoes', we say in America," Herron corrected him. "You wouldn't see Venus if she stood before you for

an hour. So of course you did not notice that Miss Blake's 'boots' were unbuttoned."

"I suspect that it was her nerviness which bowled you over," Culman remarked. "She is as cool-headed a girl as I have ever seen."

"Possibly her nerve had something to do with it," Herron admitted. "But it was her bare feet, and nothing else, that knocked me out."

"Does she know of her good fortune?" Ducasse asked, with an ironical smile.

"Not yet. She doesn't even know that my middle name is Xenophon. But before the month's out she shall know everything."

"Lucky girl," Ducasse murmured.

"You bet she's lucky," Herron agreed. "Ducasse, what are you going to do with your spare time? All the rest of us have confessed and made asses of ourselves. Now it's your turn to flop your ears."

"You have the advantage of me," Ducasse began modestly; "because nature has denied me the great and good gift of making an ass of myself. I intend to mind my own business."

"Which means prison reform in your case," Herron retorted. "Well, I hope you continue being able to get out of jails as easily as you get in. Hullo! There's Savadan."

"And Miss Blake," I reported. "Yes, and Palgrave. And there is Cheryl, farther down the road with Beckford. They see us."

We waved and hastened to join them in the shadow of the great oak.

"Have some of these?" Palgrave said, offering an enormous bag of oranges. "Nothing like them for a genuine thirst."

He was right. Before resuming the conversation we ate six apiece.

"Well," Cheryl began, "do you admit that my dream of San Francisco in ruins is true?"

"I never doubted its truth," Sylvester answered quickly. "And you were lucky to have your insurance with a sound company. Some of the shadier concerns will repudiate under cover of their earthquake clauses."

"I know," she replied. "Mr. Thompson passed a little while ago with his wife, and he told me. But all this talk about money seems so trivial at a time like this. Mr. Sylvester, will you answer me a question? I asked Mr. Savadan, and he referred me to you."

"If I can, Miss Ainsworth," Sylvester replied.

"It is very hard to state clearly," she went on; "and you must be patient. My waking dream, or vision, of San Francisco in ruins was a true forecast of the future, was it not?"

We nodded, and she continued.

"And no human being could have prevented the earthquake?"

We agreed with reluctance, guessing the object of her questions.

"Very well. No human being, then, could have prevented the fire. For after the earthquake snapped off the water mains the firemen could do nothing."

"There I disagree with you, Miss Ainsworth," Sylvester broke in quickly. "We met scores of business men in San Francisco who declared that Chief Sullivan had a whole plan of campaign mapped out for just such an emergency as this. He had marked exactly the blocks to dynamite when the fire should reach a given place. And if he had not been killed, these men asserted, the City might have been saved."

"But he *was* killed, wasn't he?" she insisted. Sylvester nodded. "Now then," she resumed, "I can state my question. If the future exists independently of us, and if certain events must happen in spite of everything we can do to prevent them, what right have we to say that we have freedom of the will? More definitely, is not Henley's courageous boast,

'I am the master of my fate,
I am the captain of my soul,'

sheer nonsense?"

Sylvester went white. "Did not you, in other words, perhaps, ask one of us a question like that once before?" he asked.

"Not that I remember. But you haven't answered me."

"Your question is a hard one. Nevertheless it can be answered. I shall give you a very short way out of your difficulty," he laughed, "and restore the freedom of your will. Please," he went on with a sudden earnestness, "remember this and think about it the rest of your life. Briefly it is this: the reflections that we see on the future reaches of the time stream are true images. But they are not unalterable."

"THAT is casuistical sophistry," she said with a faint scorn.

"It is not. Have patience. Listen, and I will explain. Events are of two kinds: those which result from uncontrolled operations of nature, and those which are the outcome of intelligence acting upon and directing the raw materials of nature. It is the next thing which you must think over before you appreciate its true meaning.

"The uncontrolled events happen, we who are trained in science believe, in such a way that one state in passing into a future state always passes through the shortest distance in space and time. This is a sort of 'principle of economy in nature' which we believe to be a true account of undirected natural events. In physics it is called the 'principle of least action,' and was first introduced, not on scientific grounds, but theological. From it all the known laws of physical science can be deduced by simple mathematical reasoning.

"Now consider the other kind of events—those resulting from the intelligent control, human or otherwise, of natural laws. By such intelligent control it is possible so to vary the path in time and space that we can change what undirected nature would make our destiny.

"The rest is obvious. The reflections of the uncontrolled passage of events are the images which we see upon the time stream. If we are scientific we shall so lengthen our paths in time and space as to circumvent the traps which nature sets for us. This, in fact, is the business of science: to foresee the predictable future and reshape our paths so that the greatest happiness shall come to the greatest number. Without science we are the beasts that brute nature would have us; with science we may in time drive out the beast and become as human as we would wish to be."

"I will think about it," she said. "Even a scientific superstition may be more workable and comforting than crude fatalism. Now, Mr. Sylvester, you have been so good about this—although I don't understand three words

of what you have said—that perhaps you will answer me another question. You studied Greek at your English school, I presume?"

"Yes; but I remember very little of it beyond the Odyssey."

"Then can you tell me what is the Greek for 'dawn'?"

Sylvester started violently. "Why do you ask?"

"Because since you and the others left my garden last Sunday afternoon—just a week ago—I have been tormented by a mad desire to know the Greek word for dawn."

"Why didn't you run up to the library here and consult a lexicon? Or ask someone else? There must be a hundred men within a stone's throw of us who could tell you in a second."

"Because," she smiled, "I had an unaccountable impulse to hear the word from you alone. I have even dreamed about asking you. Now, won't you please tell me?"

"Eos," he said.

"Oh, thank you. Now I remember."

"What do you remember?"

"Why, the Greek for dawn is Eos."

"And nothing more?"

"Of course not. Why should I?"

"Why should you? . . . I do not know. Love has made you blind."

She laughed, and blushed prettily. "Say happy, instead of blind. You are very mysterious today, Mr. Sylvester. Won't you tell me what you were thinking of?"

"I was thinking of a beast, just then," he replied.

"You had all better go and take a long nap under the trees," she said with a short laugh. "Too much playing with fire isn't good for little boys."

Palgrave's face while she was speaking was ghastly. She now turned suddenly toward him with her most winning smile.

"We have a confession to make," she said, taking Beckford's willing hand in her own, and standing prettily humble before Palgrave. "While you were asleep up yonder under the eucalyptus trees, we became engaged to each other. Won't you give us your blessing? Please: it will make our happiness complete."

Palgrave's eyes filmed. "Man and woman," he began mechanically, "stand up, that we may see—"

"But we *are* standing," she interrupted with an uneasy laugh. "You talk like a judge about to condemn us to be hanged."

"Pardon me," he murmured, "I was dreaming." He turned to us. "Let us," he went on softly, "according to our immemorial custom, wish this man and woman happiness in their marriage."

"Happiness in their marriage to this man and woman," we repeated involuntarily.

"Thank you so much for your kindness," Cheryl replied warmly. "But how strangely you all act. It is time you took a long nap. Now, we will wake you at sunset, and you must all come with me and have something really good to eat. I have discovered a dandy private boarding house on Dwight Way. Miss Blake, you and Mr. Savadan will join us?"

"Delighted," Miss Blake replied with rather an acid smile. She did not seem to like Cheryl very well. "But Mr. Savadan and I will go to look at the Greek theatre while these men get some rest." And with a curt nod to the lovers, she marched the hapless Savadan off to inspect a modern abomination of mud-colored concrete which he had no desire to see.

As Cheryl and Beckford turned and walked rapidly away from us, lost in the haze of their golden happiness, Herron sighed. "We have done this before," he said. "I wonder if John Davidson knew what he meant in that great Last Ballad of his?—

> 'Heel and toe from dawn to dusk,
> Round the world and home again.'"

CHAPTER XXX

Sylvester's Message

A FEW weeks more than twenty-five years have passed since we stood in the shade of the Le Conte oak watching Cheryl and her lover marching joyously away, arm in arm, into their new happiness. Each of us has had his full share of good and bad, which we have accepted with more or less indifference. For hour by hour and day by day the conviction has strengthened that our own lives here are but shadows. We appear always to be standing on the threshold between a dim cave of dreams and a vivid plain of reality, unable either to go forward into the light or to withdraw back into the darkness.

Whether the men and women around us are aware of a similar indecision, we cannot say, but we think not. Some years ago Sylvester proposed a simple theory which accounts for both the hard reality of the life and people about us and our own thin, mechanical existences.

Briefly, he believed that our reflections must have drifted for ages down the time stream, starting immediately after the annihilation of Eos. In all those blind ages of our involuntary drift, life on this planet was slowly evolving up to the level at which we now know it. Not until entering this life did our indestructible memories begin to return to us, and then only in disjointed and fragmentary intimations of our vanished existence. At last a chance sound precipitated our suspended minds, and we shadows found our way back in the time stream to the epoch of Eos before its annihilation.

Having in this way regained our all but infinitely remote past, we, as shadows, relived our forgotten lives by merely drifting down the stream. Finally, Sylvester believed, we must again slip into the stream, either to be borne into the undreamed future or to swim back once more to the vivid image of our perished habitation.

He even speculated on the possibility of our drifting clear through the future and back thus to the past, reliving innumerable times the entire drama of our race. For that the time stream is indeed circular and closed, he held to be indisputable. I recall that he once expressed it by referring to the space-time geometry imagined by d'Alembert and Lagrange, declaring that the time direction of space was curved as in the famous geometrical system of Riemann. But this matter was a little too technical for my comprehension; so I do not wish to impute the statement I have just made to him.

It may, for all I know, be sheer nonsense; and Sylvester was not addicted to nonsense. Ducasse informs me that Nietzsche held a similar belief, but was unable to offer any scientific basis for his dogma. It will be recalled that Nietzsche was a philosopher, utterly blame-

less of even the most elementary science, and that he died as he had lived, insane. Sylvester was nothing if not sane.

However all that may be, my own experiences during the past twenty-five years, and those of Culman, Herron, Ducasse, and Palgrave, lend this speculation a strange support. For each of us, on his involuntary excursions into time, has lived many lives not one of which leaves an intelligible residue upon reëntering this shadow life. All that remains of these distressful explorations is a vivid panorama of sheerly untranslatable images and sense impressions bound together by a tantalizing, inexplicable reasonableness.

I can describe this better, perhaps, by a comparison. Suppose a savage from the Stone Age were suddenly transported into all the bewildering complexity of our Twentieth Century life. He would see and hear but understand not one sight or a single sound. Now suppose him to be instantly sent back to his fellow savages to report upon our civilization. He would lack not only words but ideas to express his recollections. So far as his voyage in time was concerned he would be dumb.

And so with us. What we have seen is, as I have emphasized, consistent. But to us it is unintelligible. Hence we must conclude that all of our journeys in time during the last quarter century have been into the remote future, and that we are striving subconsciously to find our way back to Eos by the longest route. Whether we shall proceed before forgetfulness overtakes us—if that indeed is to be our fate—we cannot guess. Sometimes we long for the finality of failure and an end to all our doubts and futile questionings.

So when, about a month ago, we gathered in Palgrave's New York office to unseal the brass cylinder, it was not with any great eagerness that Culman's manuscript should redirect us back to Eos. When sealing the cylinder it had been Culman's intention to store up convincing evidence of the reality of our backward swim in time, and thereby refresh our faith in our true existence. But much journeying to and fro in the swirls of eternity has chilled our ardor, and we are now resigned to drift with this life whithersoever it takes us.

CULMAN presided at our reunion.

"It is the fourteenth day of April, 1931," he began. "According to our agreement made on the fifteenth day of April, 1906, we who survive are to unseal this cylinder and read its contents. Of the parties to that agreement two are dead, Savadan and Sylvester. Savadan died three months and two days after the San Francisco earthquake, that is, on July twentieth, 1906. His last days, thanks to Herron and Ducasse, were happy."

He paused for a moment, and then continued in an even voice.

"Sylvester, as you know, perished on April 22, 1915, at Ypres in the first gas attack of the World War. I have here a letter from him, written six months before his death, which I will read. It is the last word which I had from him."

" 'Dear Culman:

"When you left me a month ago to return to the United States, I had already made up my mind to take the step of which this letter is the record. You know me well enough to make apologies superfluous. You know that I hate war with a hatred as bitter as your own. My five brothers also hated it. Yet they have all been killed. I can stay out no longer.

" 'I shall not bear arms. The idea of taking human life is to me repugnant and in any circumstances whatever inexcusable. You perceive that I am still a rabid, fanatical pacifist. Also I am still an American citizen. Therefore I cannot be forced into the service against my free will. I shall join that branch which alone is not a blasphemy against our race—the Red Cross.

" 'Tomorrow I sail for France as a stretcher bearer. Where they will send me I do not know. But this I do know: if ever I am ordered to kill, I shall disobey, and stand up before a firing squad.

" 'Did you see that Henry Moseley was shot dead in the trenches at Gallipoli? By the stupidity of his death the world has lost a century. And did you read Mr. Churchill's great speech the other day? According to gossip, we have his genius to thank for the brilliant Dardanelles campaign. Who killed Moseley? A Turk, no doubt

" 'Well, old fellow, keep out of this rotten mess. There is neither reason nor common sense in a single minute of it. And yet the fearless orators of all nations are urging the men in the mud to carry it on for ten years.

" 'So long for the present. Good luck in your new experiment. Try a palladium screen if the platinum won't work. I have always suspected both of these, as we know them, of being mixtures, not true elements. Carry on!—J. J. S.' "

Culman folded up the letter and returned it to his pocket. Taking up the brass cylinder, he held it out for our inspection.

"The seals are intact," he said, "as you can see for yourselves. These marks you recognize as the mathematical symbols which Sylvester cut into the lead with his penknife. If you are satisfied that nothing has been tampered with, I will break the seals and read the manuscript in the cylinder."

None of us objecting, he cut the wire and unscrewed the cap of the cylinder. Having unrolled his manuscript, he began reading, as follows:

" 'April 15, 1906. San Francisco. This writing is a true account in its major details of an image which I saw reflected on the surface of the time stream relating to the future of this shadow life. I saw this image while in the time stream, having entered the stream at the request of Cheryl, then in Eos, to see whether her new way of love was to survive the vicissitudes of time and persist beyond Eos into its remote future. My vision, as I reported in the Chamber of the Undying Fire, confirmed Cheryl's love. It is to last. The law of reason in human mating is to be forgotten.

" 'In addition to this discovery I made many others of equal importance in the course of my experiment. All of these concern this shadow life beyond Eos, where I am now writing. The most important of these discoveries I shall now briefly transcribe.' "

Culman then proceeded rapidly with the main body of the manuscript. It was a vivid forecast, curiously accurate except in one respect, of the major operations of the World War. The exception was this: although the several chief battles were predicted in minute detail, their order in time was hopelessly confused. Thus, in Culman's prophecy, the Battle of Verdun preceded the Battle of the Marne. Each great operation of the war was

treated as a separate event in the order of its visualization upon the time stream; and no attempt had been made to coördinate the outcomes of the several battles.

In each case the numbers of killed, wounded and missing were stated with a show of great precision. Many of the figures so given differ materially from the published statistics. It will be interesting to compare the predicted losses with the actual, should the truth about the latter ever be made public.

Passing from the forecasts of the war in general, Culman's prophecy then went on to treat in detail the actions of our group in relation to the conflict. Palgrave's service with the Red Cross in Russia was accurately described. So also was that of Ducasse in the English prison camps. Culman's flight from Berlin on the eve of the declaration against France was set down in detail. His work in connection with respirators for gas masks was also elaborated, although, of course, details of his inventions were not given.

Herron's career in the Balkans was outlined, and the fact that his reports would be suppressed by the British Censor, duly emphasized. My own work was briefly and correctly noted. Last, the death of Sylvester by chlorine asphyxiation in the first gas attack of the war was accurately set forth, with the comment that Sylvester himself was aware of the general manner in which he should meet his end, having seen its reflection on the time stream.

CULMAN rolled up his manuscript and returned it to the cylinder.

"In 1914 I notified the proper authorities that Germany would probably introduce chlorine gas as a military weapon," he said. "It was due entirely to the good offices of Sylvester and Ducasse that I was released from the asylum. My experience convinced me that a knowledge of the future is an undesirable asset. In this I was strengthened by subsequent events. I have learned that less than sixty hours before the first gas attack three German deserters came into the British lines with full details of the proposed infamy. The officers discredited the information, believing it impossible for any civilized nation to resort to such warfare."

"It is like belief in a future existence," Herron remarked. "Some are so constituted that they would continue to disbelieve in a life beyond the grave even if their own dead returned to them with the lilies of Paradise in their hands."

"You used to be that way yourself," Ducasse laughed. "What changed you? Marriage?"

"Call it marriage if you like," Herron replied. "I prefer the word love."

"Which reminds me of Cheryl," Palgrave remarked in the awkward silence which followed Herron's revelation "She and Beckford are still foolishly happy. She thinks he is the greatest man in America, and he thinks—well, I don't know what. Any way he's going in tooth and nail for the highest politics on the strength of his war record."

"War record?" Culman echoed incredulously." Beckford? What did he do?"

"Why, haven't you heard? I thought everybody from the Gulf to Baffin Bay and from Maine to California had read Beckford's tremendous speeches."

"Oh—that. Yes; I daresay he will be elected to whatever office he fancies. His typewriter too, they say, was never silent."

"Something like mine, then, at present," Herron laughed. "My wife is pounding away at it six hours a day."

"Good for her," Ducasse exclaimed. "When will your book be out?"

"Next month. My backers want to get it on the market—at nominal cost—before the Russian fiasco turns into a tragedy. The Soviets may have remembered the Law of Reason, but they have obviously overlooked the other. That book of mine is unique."

"Then it must be truthful," Ducasse remarked with a return of his old cynicism. "By the way, Palgrave, why did you rush off to California last month? One of your associates, with tears in his eyes, was telling me today how perilously near your practice came to going to pot in your absence."

Palgrave reddened with embarrassment.

"Since you ask me a plain question, I will give you a plain answer. Cheryl telegraphed for me."

"Why?" Culman asked. "If it is anything private you need not tell us."

"It is nothing that need be kept from anyone here, for all of you will understand its true significance. I went to examine Edward."

"Their boy?" Ducasse asked.

"Yes. He is now fifteen, and a fine, healthy youngster. There is nothing whatever the matter with him, physically, mentally or morally. All in all he is as perfect a specimen as I have ever examined. And he shows unmistakable signs of genius. He writes poetry—poetry, mind, not mere verse—of a high order of beauty. In quality it is a mystical compound of light and fire—just what Blake might have written had he been gifted with Shelley's sense of form and his clear headed logic. In short I am convinced that the boy remembers."

"Remembers what?" we asked.

"Eos."

"Is that why Cheryl sent for you?" Culman demanded.

"It is. Only she is unaware of her motive. The boy has been having intensely vivid dreams, and she fears brain disease or degeneracy. Some young jackass of a practitioner filled her up with a lot of Jewish psychology which he has half assimilated from the effusions of Freud, Jung, Brill, and the rest of that enthusiastic crowd. Then he proceeded to analyze her boy's dreams and his harmless playthings in a singularly irrelevant hotch potch of pseudo-scientific bosh. The fact that the boy is always dreaming of scarlet blossoms had an obscure sexual significance for this up to date psychoanalyst. I asked the boy to describe the blossoms. He did so in detail. I will leave you to guess what they were."

"THOSE on the great tree by the Council Chambers?" Herron asked.

"Exactly. He even had the elliptical arrangement of the forty-seven yellow stamens precisely right."

"Did you pacify Cheryl?"

"After some fuss. I think she will have commonsense enough to let her son develop his genius in his own way. At any rate I got her to promise to take him to no more amateur Freudians."

"What about his playthings?" I asked. "You implied that there was something unusual there too."

"Oh, yes. Before I saw the boy's collection—all neatly housed in little coops with grass runways fenced off in

front—I had no idea so many different kinds of lizards existed. Or if I did know, I never dreamed that there were such ugly ones. He must have nearly a hundred. The horned toads seem to be his special pets."

"What on earth was the matter with his farming reptiles if he wanted to?" Ducasse asked. "Of course all of them were non-poisonous?"

"Of course. The harm was in my jackass friend's mind. He had just been reading a curious book on Mona Lisa, in which poor old Leonardo da Vinci is liberally smeared with the new Hebrew psychology. In that the gifted author—Freud, or one of his followers—acutely remarks that a love of animals in early childhood is strong evidence of sadistic traits. The remark stuck in my friend's mind, and he applied it to that poor kid's unfortunate love of ugly lizards. Cheryl used a very complete dictionary and found out exactly what 'sadistic' means. Naturally she was shocked. Then she telegraphed for me."

"There is another explanation of the boy's love of reptiles," I said. "I will tell you about it some day. Now it will be enough to remark that Cheryl seems to have got the son she always longed for."

"So their young son is sound in every way?" Herron asked.

"Absolutely. And on top of it all he is a genius."

"Then," Herron remarked, "the law of reason seems to be unnecessary in this life. Cheryl's substitute may be just as good after all."

"Possibly," Palgrave admitted. "Having forgotten what love feels like, I cannot say."

We lapsed into moody silence, and sat staring at the polished surface of the table.

"We are drifting into the time stream again," Ducasse murmured drowsily. "Watch the reflections on the table top."

He was right. The walls of the room receded, and a new radiance quivered on the ampler air of this vast chamber into which we had drifted. It was a physical laboratory of the not far distant future. That this image was indeed not probably farther than a century down the stream, we recognized from the few familiar measuring instruments here and there among the strange apparatus of a future science.

As so often before we appeared to be regarding the reflection of the time stream through thick glass. A will exterior to our own impelled us to look toward a long metal table against the farther wall of the laboratory From the centre of this table streamed a steady light which at first all but blinded us. Then our vision, becoming reaccustomed to an old habit, pierced the blaze to the small incandescent sphere from which it issued in sheaves of dazzling rays. With a shock of glad wonder we recognized once more the peculiar faint violet tinge of the undying fire. It had been rediscovered!

Then we became aware of a familiar figure standing motionless by the table, gazing steadily down at the incandescent ball. He too was but a reflection and, like us, appeared to be watching the fire from behind a screen of thick glass. He did not perceive our presence in the time stream. Evidently he was absorbed in thought.

Presently his image turned from the ball and moved toward a work desk at the far end of the laboratory. We followed, and stood with him looking over the litter of open books and closely written papers on the desk. All the books but one were opened at pages covered with the intricacies of some future mathematics, or with the clear cut diagrams of physical apparatus as yet undesigned in this shadow life.

The one exception was a book of poems. On looking for the title, I saw the single word "Hellas" across the top of the page, and thought at once of Shelley's sublime prophecy which bears that name.

Still Sylvester did not perceive our near presence beside him in the time stream. His eyes travelled over the intricate pages of his beloved mathematics, and then, as if by accident, rested for an instant upon the poem. His face lit up with a glad recognition: it had always been a favorite of his.

The owner of the book, who, no doubt was also the rediscoverer of the undying fire, had marked a passage of the verse. Sylvester's finger followed this mark down the page as he read, and we with him, the lines of that superb chorus which closes Shelley's vision:

"The world's great age begins anew,
The golden years return,
The earth doth like a snake renew
Her winter weeds outworn . . .

"Saturn and Love their long repose
Shall burst, more bright and good
Than all who fell, than One who rose,
Than many unsubdued:
Not gold, not blood their altar dowers
But votive tears and symbol flowers.

"Oh cease! must hate and death return?
Cease! must men kill and die?
Cease! drain not to its dregs the urn
Of bitter prophecy:
The world is weary of the past,
Oh, might it die or rest at last!"

THE END

THE ROCKET IN THE NEXT WAR

THE development of terrible means of destruction for the next war, such as poisonous gases, unbelievably powerful explosives and disease-spreading germs, has led militarists to wonder what agents might be used to introduce them into enemy countries. It is possible that the success or failure of these fiendish devices might depend upon the range and power of artillery and aircraft.

David Lasser, the author of this article (who is also president of the American Interplanetary Society, and the author of "The Conquest of Space," the first English book on the rocket), believes that the answer of the militarists will be found ultimately in the rocket. He shows here with great clarity how the rocket might be used in a next war to virtually destroy civilization.

IN THE BIG MARCH ISSUE OF

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The Final War

(*Continued from Page* 1129)

lege himself. He is captain now, and commander of a station. We might go up and see him, after we shelter the men for the day. He generally has pretty good dope about the present lines from his tele-observation machines."

"The Division seems to have a lot of Irontown men," Burke said. "I certainly would like to see the old professor. Is he getting along all right?"

"Comparatively, he has nothing to complain. Except for occasional bombardments, it's all right back here in the third."

"Do you spend your rest periods back here?"

"Well, there is no use hiding things from you, John, but I wouldn't tell the kids. There are no rest periods here in the Liberty Salient. They just march new independent companies in when the first lines seem to get thin. There isn't much command in front, not enough communication back. That's why they have these new independent combat companies like yours. The old men tell the new ones what little they know about the enemy, and when the company gets chewed up, they march in another one. But hell, John, you see I am still alive."

Before them were the wet, sticky, gas curtains, indicating that the passage was leading into the open. A sign read: "Silence—Close face plates."

Young turned to the captain: "We go outside here. We stay in the mole tank park outside until it gets dark."

Burke raised his arm. "Halt! Everybody listen before we get out. The enemy is only ten miles away. It is deadly to move in the open during daylight. It is probably deadly to speak loud or to lift the face plate. Daylight will come in thirty minutes. Until then everybody has to be on his station. Corporal Young will place you in crews of eight behind mole tanks. Dig in under the tail end, without exposing the tank and stay quiet during the day. We are in receiving position. If the enemy should attack and overrun the two positions ahead, which is not probable, the position is to be held. If I am absent or become a casualty, Sergeant Blake is in command. With coming darkness we will eat and advance to the front lines. Now close face plates and silence."

The curtains flapped back. The tunnel became low, the men had to crawl. Outside were mysterious, frightful noises on the background of a dull, menacing rumble that shook the very ground.

The men wriggled through a narrow foxhole. When eight had passed, they were led by the guide through deep, irregular furrows. The sky began to pale. In the east stood with serene clearness the morning star. The horizon was still flickering with muzzle flashes.

BURIED in the ground before them was a strange metal monster, one of the mysterious mole tanks that had been developed during the last years. After frightful losses in the tank battalions, inventors had found a way to move underground. The snout of these tanks consisted of four drill-heads, drilling ahead while the tank moved. Conveyor screws transported the loosened soil over the length of the tank and packed it at the tail end. The bottom of the machine rested on wide caterpillar treads. The tanks were held on an even keel and steered by powerful gyroscopes. If the soil was not too heavy, they could move driven by electric motors, with a top speed of three miles per hour. Their armament consisted of a light machine gun, a gas nozzle and a flame projector, arranged between the drill heads. The first appearance of these enclosed, gas-tight machines had caused almost a panic in the underworld of the enemy, until means to combat them had been devised, and captured tanks had been copied and improved.

The eight men burrowed into the soil under the lower conveyor screws of the machine, while Young placed the next crew under another tank. In ten minutes the entire company was in position, the Captain, Sergeant Blake, Young and the last three men under a tank, ten feet from the tunnel exit. Finally Young and Burke crawled back into the tunnel, carefully closing the foxhole behind themselves with a piece of mud-smeared burlap.

They went back to the place where the galleries to the different combat units branched, and took a passage marked "Staff LY 531." On either side were the bunks of telephonists and runners, listening devices, officers' quarters, corridors with the oscillators for the wave barrage and other mysterious electrical apparatus and finally the office of the traffic officer.

They could not learn much here. "You will have to see for yourself," they were told. "The first lines changed today. The tunnel to the second lines is practicable yet. The second position proper seems to be banged up pretty much. From there is only occasional communication by runners that got through. Radio, if there is any left in front, won't work, because wave barrage has been up from both sides for twenty-four hours. See what you can do tonight. Good luck."

When they were on the corridor again, Young said: "Well, let's see the professor. It is only a little ways from here."

Through other galleries they came to a narrow steel door marked "CX 317." They entered cautiously.

The low, steel-lined cave was almost dark. Over a small, lighted table hunched a man in a captain's uniform. His unscrewed helmet was beside him on the floor.

He turned a flashlight on the visitors. "Oh, it's you, Fred. And, well, I'll be damned, if it isn't John Burke! The whole Liberty Peace Conference. Can the ceremonies, boys, I haven't time to return your salute. I found something. See here."

The luminous top of the table showed a miniature landscape, about a quarter square mile of battlefield in bird's-eye view.

"Eight miles behind their lines, Fred. And see this here?" Lovingly he pointed to a tiny speck in the grotesque crater field. Tunnel entrance. One of those asses came out in broad daylight. Must have forgotten something. See all the tracks here? Beautiful. But I had a beastly time getting it, until I found a hole in the wave barrage to sneak my tele through. It's right there now. I received a fresh load of heavy torpedoes last night. The boys got one in the shaft now. Here goes."

His hands on delicate dials were like the hands of a girl. A cross-hair wandered, until it rested over the small speck in the landscape. He called into the mouthpiece of a speaking tube: "80,710,41 left, 34 high, let her go."

Behind the steel wall was a click and a rushing sound. "Fired," it came through the tube.

The captain followed a small glowing point on the table top. "There she goes, swoosh—there."

There was a glaring flash in the landscape, and then a vast dustcloud.

"Just right. See here, we busted it open. The monkeys in that tunnel are done for, pasted to the walls. Another one. 80,715,38 left, 3 low. Let her go. Delicate business this here, there . . . Now they are cutting in with that wave barrage again. Good night, there goes another tele observer. Well, it was worth it. Give me artillery group LY 531, Captain Weller. Yes, here, Captain Sikorsky. Just pasted a couple of good ones on a tunnel entrance. At 43.71 by 61.80. See that you get the old man to put a couple of howitzer batteries on the spit. It's worthwhile. Yes, correct. Good hunting, yes, good hell, Weller!"

THE captain switched the light on. He was the same elderly, kind-looking gentleman with the high forehead and twinkling eyes. But somehow the spirit of untroubled merriment, that had been characteristic of his personality was gone. His laugh was forced, and his eyes had a haunted look. He talked much and fast.

"That's that, boys, they will keep up the wave barrage for good. No more monkeying with radio in that neighborhood for today. The artillery will do the rest. Crude boys, these artillerists. I know those howitzers will get it in the neck when they start pounding. You can't shoot in these parts without being blown to bits yourself. Crude methods.

"Have a seat, boys. There in the corner is a can of neutralizer. Lots of CBX around outside. Well, it surely feels good to see you again, John. I heard from Fred, what happened to you in Liberty."

The men rubbed their gauntlets and the rim around the face opening of their helmets with the grey gas neutralizer paste before sitting down on boxes.

Sikorsky looked from one to the other. "You boys surely look different from the men I knew back in Irontown College. Fred, the physicist, John, the historian, and I, the professor, splitting atoms." He chuckled. "I split other things now, and try to do it in a merry mood. You know, John, Fred will tell you that they consider me the champion killer in this neighborhood. These torpedoes are beastly stuff.

"The worst explosive that isn't barrel safe anymore, is in them. And you can control the damn things twisting them right into the tunnel exits. I never knew what I could do until last year when I lived through an experience where most witnesses were killed. They put one of their torpedoes from over there in our tunnel. It is ghastly, beastly and dirty." He laughed shrilly. "You should have seen the men, maybe you did some time. Blue and black in the face, pasted against the wall by sheer air pressure. And these forces are here in my finger tips, delicate business it is, this modern fighting."

Burke saw that the professor's nerves were shattered. He felt how the man suffered trying to escape from himself when he laughed. Knowing that conversation along technical lines would quiet the mind of the old scientist he asked: "How do you manage your torpedo work, Captain? It might help to know, when one tries to escape."

Young heard his friend's question with a tired smile. Sikorsky became serious at once. "It won't help you to know," he said, "you can't escape if they have your picture in the tele observer. But they should have told you how it is done. It is nothing mysterious. They have even better equipment on the other side, and we scientists ought to know. My God, we scientists!"

The elderly gentleman, captain of the torpedo station CX 317, had changed for a moment. Once more he was the professor, who had lectured before young men long ago in another life.

"Do you see that apparatus over there in the corner? It is a teleobserver. It is nothing but a helicopter flying machine, piloted from here by radio. Inside is a small audio and vision broadcasting set. I receive the picture here, can hear too, if I want to. The things are practically noiseless since Cramer invented his damnable noiseless prop, and they are hard to see if the sun does not glare on them.

"You see the thing is only three feet big and transparent. When I see what I am looking for, I pilot a torpedo to the spot. They are also radio controlled, the smaller more flexible and noiseless ones flying machines, the heavier ones rockets. All carry a considerable load of the worst explosives or poisons that have been invented so far. There is nothing to it, but it is delicate business and one must have a certain touch in the fingers and master some calculations to be a successful torpedo operator. It is a business for a scientist to kill scientifically. Beastly . . ." The voice of the professor had become bitter, tired and nauseated.

Young made a defending motion. "Don't, we don't want to grow crazy."

The captain fell back into his chair. "You are right, Fred. I suppose you go up again tonight and want to know what I know. Not much, Fred, not much, but the little I know is bad. Activity where you look. And crude, they get cruder every day. Much artillery, tons and tons. Mole tanks. A dozen or so battle tanks, they probably got stuck during the night. Silly, blown up in no time. Electromagnetic disturbances, those damnable projectors probably. They project high frequency fields for miles now, any conductor in the path gets red hot. Well, and gas of all variations of course, and vibration waves and flame projectors and what not. You know the stuff. But they certainly have stepped up their voltage since you left the day before yesterday, Fred. I think they are up to something.

"The best road to the second position is the tunnel, of course. But get out of it quickly, they found most of the exits. Then cut over to the right. You know the Kitchen Ravine. That seems the best now, at least they can't get you with projectors there. Find out what tunneling they have left in the first position. That's all.

"By the way, I understand they are going to take you out in four months and put you in the laboratories. They have a couple of big men in some of them. Remember

Professor Doehler? Well, he is in BL 1243 now. It is one of their pet laboratories. They made a colonel out of him. Little hunchback Doehler, a big brain with a little misfit of a body on it, but a scientist if there ever was one. A man big enough to know that there is no limit between physics and chemistry. He knows both. I heard he is after big things, and they know it. A man like Doehler is worth more than six divisions. I will see that I get word to him to put a requisition in for you. He will do it. It would be nice for you to work for him and it might get you out of hell a couple of weeks earlier."

CHAPTER IX

The Invader

YOUNG smiled. "Before I become a casualty. Thanks, Captain. But I don't think I would want to go now that John is here."

Sikorsky said to Burke: "Your friend is talking a lot of nonsense. Anybody who refuses to get out of this for a couple of months is cracked. And even if you two fellows should get a chance to stick together up there, which is doubtful, you'll have to converse with closed gas helmets most of the time."

Burke laughed. "I think Fred wants to protect me from twenty-seven inch shells up there, putting his arm around me. Sure he will go to the labs, the sooner the better. Shut up, Fred. I am your superior officer. You write to Doehler, Captain.

"But I think we better move. Fred, and see our kids in the mole tank park. Poor fellows. We lost ten of them so far."

The corporal asked: "Is a wave barrage up in the neighborhood?"

"Yes, there it is." The captain pointed at the wavering needle of an indicator. "The howitzers shooting at my tunnel target are right behind us. They would not dare to work with a tele in the sky. Good luck and good hell, boys, think of your old professor."

The men closed the door of the torpedo station. In the corridor they heard the gulping reports of heavy howitzers firing outside. They closed the face plates of their helmets and passed the gas curtains.

Outside a bright, hopeful morning sun had risen. Young and Burke covered themselves with muddy burlap sheets, before they left the exit. Inch for inch they crawled patiently to the buried mole tank. One could not know what eyes were watching.

The sergeant and the three men crouched in the little foxhole under the tank like strange, muddy monsters of the deep. The sergeant moved his head when he saw Young and Burke. The three recruits seemed to be asleep. Young sketched the probable route on his map, scrawled under it "In case we get separated" and handed the dirty scrap to the captain.

With a soft, rushing sound the projectiles of the firing howitzers passed over them. From the first lines came a confused, droning rumble. Somebody stirred and yawned in the tank above them. Falling asleep, the corporal heard that the howitzer batteries received an answer. With fierce, whining howl the projectiles fell. The ground shook when they exploded.

The men were aroused by a deafening crash. A shell had burst six feet beside the tank. Nobody was hurt. The sun was low in the west. The howitzers had ceased firing, they were probably put out of action by now. Slowly a red sun disappeared in the gray murk of artillery bursts. Slowly darkness fell.

Sergeant Blake went from tank to tank arousing the men. One by one they crawled back into the tunnel. Behind the gas curtains they lined up. Down on the lowest level under the central hall was a kitchen like Hellgate only smaller. They ate once more.

After that a tunnel marked "To 2nd" swallowed them. There was no railway in it. Before them and behind them were other companies moving in the same direction, loaded down heavily with supplies and weapons.

For miles the tunnel went on.

There was the word "Gas" on the wall, painted crudely with red paint. Gas curtains, installed hurriedly, closed the passage. The electric light ceased. Traffic stopped for times, men stood packed closely in the dark. Before them huge explosions reverberated from the tunnel walls. The company moved and stopped, pushing and being pushed, following a small, glowing pilot light on the helmet of the guide. The recruits were clinging to the corporal like frightened children, seeing in him a man who knew this frightful, mysterious world, and who would protect them if he could.

Before them was a grating noise. Flashlights stabbed through the darkness. The tunnel walls bulged and burst; huge steel blades, polished in the soil, turned slowly with irresistible force. A mole tank broke into the tunnel. There was a movement backward, away from the sinister, menacing machine, but then a gusher of red flame, wrapped in black smoke, broke out between the revolving blades. There was a frantic struggle of bodies, yells of agony, muffled and unearthly through air filters, explosions of hand-grenades and the rattling roar of a machine gun. Farther back a tripod rose over the helmets, topped with a cylindrical case, from which heavy cables dangled.

On the smooth steel flank of the tank appeared a circular spot of red glow, it grew brighter and brighter, yellow and white. A fearful, throbbing pain went through the bodies of the men, who crouched down as far as they could, to escape the magnetic wave that the projector hurled against the tank. The blades had ceased to revolve, the red gusher died in a flaming trickle when the glowing spot in the tank burst into white, incandescent stars. There was a muffled explosion inside, red flames burst through the hole.

The tank was finished. Men with fire extinguishers climbed over the bodies of dead and wounded. Thick, acrid fumes filled the tunnel. The blinding tongues of oxygen torches cut the hot plates of the tank, and through its smoldering interior climbed endless rows of soldiers toward the enemy, toward the awful explosions at the tunnel exits.

Young knew a narrow branch tunnel, leading to the right. Here he tried to rally his men. There were only about seventy left. A few stragglers, that had lost their units, joined him. The lieutenant and Sergeant Blake helped him to close the men together. "Come on, kids," the sergeant bellowed, "it's better outside."

(To be continued)

Do You Want Science Fiction Movies?

It's up to you, science fiction lovers!

Motion picture compaies are asking this question, too. But despite the success of science fiction in this country, and the rapidly growing reading public, the number of science fiction movies that have appeared in America have been pitifully few.

"Metropolis" and "By Rocket To The Moon" were German films; only "Just Imagine" which was after all a humorous rather than a realistic film, "The Mysterious Island" and one or two others have been filmed in America.

Now comes the Universal films "Frankenstein," which is a huge success and "the Invisible Man" of H. G Wells; and R-K-O has a film resembling the "Mysterious Island" But these few films are mere crumbs thrown to the hungry lover of science fiction. And even the millions who do not read science fiction, who are lovers of adventure, and exploration in new places and times, are becoming tired of the monotony of sex, gangster and war pictures.

Do You Want Science Fiction Movies?

If you do, you have but to make yourself heard. Many of our readers are writing to film companies to make their desires known. BUT THAT IS NOT ENOUGH! Film companies are guided by the wishes of thousands and tens of thousands, not by a few letters here and there.

Wonder Stories and Wonder Stories Quarterly Will Make Your Demand Count

We are organizing a gigantic petition signed by all those who want science fiction movies and will present this petition to the large motion picture companies. IT IS UP TO YOU as lovers of science fiction to make this a success.

One petition blank from each reader of Wonder Stories will be sufficient to make a powerful appeal to any movie magnate.

Get Five Signatures to This Petition

and return them to us at once. We will gather them together and **show the motion picture companies the enormous demand for science fiction movies.**

Sign this petition yourself, get four other signatures of your friends and relatives and return them to us. We will do the rest!

If you wish additional petition blanks write to us for them immediately.

EDITOR, WONDER STORIES
98 Park Place,
New York.

We, the undersigned, herewith add our voices to the great demand of lovers of science fiction, for the production of a reasonable number of Science Fiction Movies in Americ. If such pictures are produced, we will support them loyally and urge our friends to do likewise.

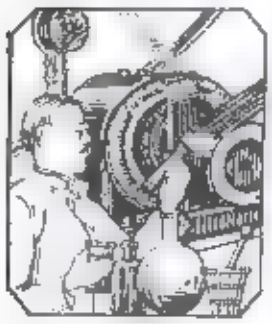
(Name—Please write plainly) (Address)

(Name) (Address)

(Name) (Address)

(Name) (Address)

(Name) (Address)



Science Questions and Answers

This department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical also, to print personal answers as soon as we receive questions. However, questions of general interest will receive careful attention.

Einstein Again

Editor Science Questions and Answers

Will you please answer the following questions for me.

1. If a body would be traveling in a definite direction at a speed of 161,000 miles per second, the body would be shortened in the direction of its motion by one-half, would it not? If it were moving at the rate of 182,000 miles per second its size in the direction of its motion would be zero, would it not?

2. What would be the size of a spherical body 100 feet in diameter, if it were traveling at a speed greater than that of light?

Albert Edwards,
Urbana, Ohio

(The first thing that must be made clear in discussing the contraction of moving bodies according to the Lorentz-Fitzgerald contraction theory, is that the contraction is not real but only apparent. According to the theory, if a body is moving with reference to an observer at a speed v then that body according to the observer will be contracted in its length in the direction of motion according to the formula

$$L = \sqrt{1-\left(\frac{v}{V}\right)^2}$$

where L is the relation of the body's length as a fraction of its former length, when the body is moving at speed v and where V is the speed of light, 186,200 miles a second.

This is the meaning of the relativity of time, motion and space as propounded by Einstein. All of these terms must be referred to a definite observer in order to discuss them. Hence although to one observer a body may appear to be moving at 1000 miles a second, according to another it may be moving at 500 or 2,000 miles a second. Hence any contraction of the body will depend upon the velocity of the body according to the particular observer we speak about. According to any observer who is on the body in question there will be no contraction, for according to that observer the velocity of the body is zero, they both move together.

This preliminary understanding is quite necessary before the questions asked by our correspondent can be answered.

Now assuming, that a body has a velocity relative to an observer of 161,000 miles a second, then according to that observer the body will appear to be contracted in the direction of its motion by the Lorentz-Fitzgerald Contraction theory to ½ of the length when measured when the body was at rest to that observer. Let us assume that we are going to shoot some projectile from the earth at a speed of 161,000 miles a second. Before we set it off we measure its length, which is 100 feet. That is its length according to us, for we are at rest with reference to the body. Its length with reference to an observer on Mars will not be 100 feet, but will be smaller, for according to that observer the projectile is moving, even though it is at rest with relation to the earth. Now let us assume that we shoot off the projectile and it attains a speed of 161,000 miles a second with reference to the earth. Then to an observer on the earth, the length of the body will have contracted to 50 feet.

But here comes the rub. Let us assume that there is an observer on the projectile and when it is traveling at 161,000 miles a second he measured the size of the earth. To him the projectile will be at rest and the earth will be moving away at 161,000 miles a second, and the earth will have contracted to ½ its length, in the direction of motion. One contraction is no more and no less real than the other.

Physicists who accept Einstein's formulae assume that the velocity of light is a limiting velocity and that nothing can exceed it. According to the Lorentz-Fitzgerald contraction theory if the velocity v of a body (according to an observer) were greater than the velocity of light then the fraction v/V would be greater than 1, and so L would be a negative quantity. The length of the 100-foot sphere would become negative. One has a perfect right to say that the Lorentz-Fitzgerald Formula must be wrong to give such a result, and that the limiting of all velocities to that of light is assumed in order to make the contraction formula hold together. However one must be a super-mathematician to argue about this with Einstein. We can either accept the Einstein assumptions or reject them.—*Editor.*)

Dead Stars

Editor Science Questions and Answers:

Is a star still a star when it is dead? Is it then called a cold star, or is it known as a "dead star"? Is there any such thing in astronomy as a "dead star"?

Charles A. Baker,
Boston, Mass.

(By definition a star is any self-luminous heavenly body, as so far as our observation goes, outside of the solar system whose location in the heavens is practically fixed in position. We thus divide heavenly bodies into fixed stars, and planets. The planets are the satellites of our own sun, whose motion, as distinguished from that of stars, is relatively rapid through the heavens.

By a dead star we assume that our correspondent means one that has cooled off so much that it no longer gives off light. We see no reason to assume why that body may still not be called a star. The planets of the solar system (and they are the only planets we know of) are parts of a star, our sun, that were thrown off or pulled off the sun, and being small cooled relatively rapidly until they were no longer luminous. The planets are therefore cooled off "starlets." The designation of planets is used in astronomy to distinguish our sister worlds that we see in the skies and which revolve about the sun, from those that are remote in space. The planets as seen by the naked eye look just like stars, and except for their rapid motion through the heavens, the ancients did not distinguish them as different from the stars.

No doubt in space a great many stars have cooled off sufficiently that they are no longer self-luminous. The only way we could detect such a body would be by its shutting out the light from other luminous bodies behind it. If one cold star were large enough or if there were a group of them close together they would form a patch in the sky that was dark and easily distinguishable from the dazzling brightness of the rest of the heavens. Such a patch has actually been found in the star cloud in Sagittarius, and in the constellation in Orion. In these cases they are dark patches in the midst of brighter areas. Their true nature we do not know. But dead stars there must be throughout the whole universe.—*Editor.*)

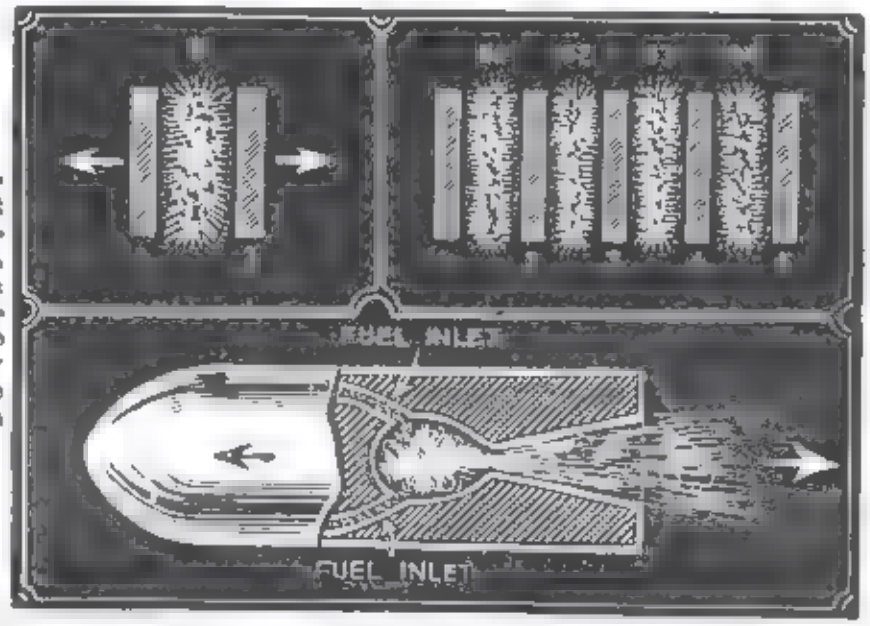
Nothing to Push Against

Editor Science Questions and Answers

I am an enthusiastic reader of your wonderful magazine, WONDER STORIES, and wish to add my small note to the pean of praise sung in its favor.

I am especially interested in stories of interplanetary travel. Among my friends there is almost always a friendly argument about these stories. The question most always argued is not, as you would imagine, whether life is possible on the other planets, but whether man can build a machine to carry him to them. In particular, we have some who doubt the effectiveness of the rocket as a method of transportation. They think a rocket will not work in the vacuum of outer space, and advance as proof the fact that the rocket has nothing to "push against."

Earl Wilkinson,
Newport, Ky.



Showing, by the comparison of a rocket with an explosion between two objects, how the rocket can operate in airless interstellar space. The upper figures show the explosions and the lower the action of a rocket.

(The question of how a rocket can operate in interplanetary space where it has "nothing to push against" is more puzzling to the average man than any of the other complexities of the interplanetary problem.

The following illustration may serve to make it clear.

Assume there are two blocks of material, numbers 1 and 2, in interstellar space, separated by a layer of an explosive S. Now it is desired to move block 1 to the left. It should be quite obvious that if the explosive is set off, then the two blocks 1 and 2 will fly violently apart, block 1 moving to the left and block 2 to the right. Now this action, it should also be obvious, does not depend on the medium in which it occurs. It will occur just as easily in a vacuum as in air, or water.

Suppose we desire to give a greater velocity to block 1 than is possible with one layer of explosive. Then we will use a number of blocks, such as 2, 3, 4, and 5, each separated by a layer of explosive. First, explosive layer S4 will be set off. Block 5 will move to the right, and the rest of the blocks to the left with a small velocity. Then explosive S3 will be set off, and block 4 will move to the right by the detonation, and the rest will move to the left, increasing their velocity. Then S2 will be set off and block 3 will go to the right and 1 and 2 to the left, increasing their velocity still more. Finally S1 will be set off and blocks 1 and 2 will fly apart, still further increasing block 1's speed to the left. It is obvious that by increasing the number of blocks the velocity can be increased, theoretically, indefinitely.

(*Continued on page* 1194)

The Reader Speaks

In this department we will publish every month your opinions. After all, your constructive criticism is the only way we have of knowing how you like your stories. All are welcome. All of your letters will be read carefully and the best of them published each month in the order received. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brickbat. All are welcome. All of your letters will be read carefully and the best of them published each month in the order received. It makes no difference whether your letter is complimentary, critical, or whether it contains and postage is remitted.

Prosperity's Messenger Boy

Editor WONDER STORIES

WONDER STORIES opens the new year in an extremely auspicious manner. As I am renewing my subscription to the QUARTERLY at this time, I am taking advantage of the fact that another sheet in the envelope with the renewal will cost nothing extra. Not that I have Scotch blood, business has evidently adopted a saner policy. The balloon of wartime inflation was bound to encounter a pin sooner or later. Of [illegible] The [illegible]

The new WONDER STORIES is certainly not timid! Look at the magnificent size to which it has returned. Cast your eyes on the new dress. Gaze in wonder at the silken paper underthings. Read the great stories between its pages. Admire the fine illustrations. Exclaim over the excellent makeup, the unimpeachable correctness of the printing, the exactly-right size of type, the beautifully executed covers, the valuable "Science Questions and Answers" department, the interesting readers' letters. And last but not least, Mr Brandt is with us. Surely WONDER STORIES will hit the peak now! With all this staring him in the face, how can anyone doubt that the depression is over? Hurrah for WONDER STORIES, prosperity's messenger boy!

But lest the editors die of a bursted ego, I will cast around for a few brickbats. Hard to find, I admit, but I don't take a correspondence course in detective work for nothing. Here goes. First, the January cover. How come two she is are bursting on earth at the same time from one gun firing at intervals of from one to four hours? Hmmmm. That's not such an important brickbat at that, is it? I'll have to do better.

I think there enough bad characters running around in real life without putting them in our fiction. I don't object to having them in fiction, but I would like to see them properly hanged when they have served their purpose in the story. Here are Lem Gulliver and Red Tonti again victorious over the forces of right. I thought the authors had received enough warnings from the readers to cut it out. I see they compromised by causing Lem Gulliver to lose an arm. It didn't seem to bother his criminal activities any so its value was negligible. Mighty one-armed criminals overcoming all [illegible] lords of [illegible]! Phooey! Don't let it happen [illegible] causing young girls to com[illegible] We [illegible] Plenty of other people, not even graced with a correspondence course, will fire that one at you. I'll have to do some more [illegible]

In "The Crystal Empire" Don Brink appears at the end of the story, blood-soaked, weakened by his encounters with the crystals, and in the face of the mighty power of the emperor crystal which holds a company of strong men helpless under its hypnotic eye, pits his weakened condition [illegible] men to "Ready-Aim-Fire." Phooey again!

Well, if the ego is sufficiently deflated now, I'll recompense it with a final compliment. "The Time Stream" is absolutely the most absorbing story I have ever read in WONDER STORIES.

In case that compliment is too hot, why does Paul always picture the moon as if it had been subjected to one terrific and cataclysmic explosion which blew the edges of the craters up just as the edges of a piece of paper stick up when a stone is thrown through it; or like a tin can that has been used for target practice?

However, I am satisfied with WONDER STORIES and as long as either of us exist, we will be together, WONDER STORIES and I.

Raymond A. Palmer,
Milwaukee, Wis.

(Although we may not fit exactly Mr. Palmer's description of us as "prosperity's messenger boy" our stories at least help sorely ridden people to forget their immediate anxieties, and to cause them to realize that there are better and worse worlds than that in which we exist.

We understand that our authors were well aware of the possible criticism that might be levelled against the apparent success of Lem Gulliver. The future stories should explain what might seem to be a mysterious attitude on the authors' part toward criminals. Let's wait and see.—*Editor.*)

The Hen and the Egg

Editor WONDER STORIES

Your editorial, "Wonders of Space Radiation" fired my imagination on the question, "which came first, space or matter"

The answer to this question is different from that of the hen and the egg. The egg could not have been produced without the hen, while the hen could have been produced by evolution, Space and matter however were created simultaneously.

To prove that space and matter were contemporaneous we must consider them from the viewpoint of relativity. But first let me define space and matter. Space is volume or distance, matter is anything that takes up space. From its definition it is evident that there can be no matter if there is no space. Therefore matter could not have been there first. This would seem to prove that space was created first, but it was not.

Space exists only relatively to matter. That is, since matter occupies space, space is defined by matter, or since space is the volume of, or the distance between matter, it cannot exist without matter. This would seem to prove that matter was first. But how could matter have been created unless it had space to occupy? From these arguments I draw the conclusion that space and matter came into being at the same instant.

Now there arises the question which was created and which came automatically into existence? To form a conclusion we must again look to the definition of space and matter. We deduce that space is abstract or materially nonexistent, matter is concrete. Therefore, matter must have been created and space automatically come into existence.

Robert Feeney,
Kansas City, Mo.

(Mr Feeney's reasoning is perfectly right so far as he goes. We must remember however that space is just a mental concept, and matter is but a sensual impression. We found it necessary to have a container for matter, we called that space. And since it would have been inconsistent to have the areas in between chunks of matter areas of nothingness, we had to define them as space also. Mr Feeney does however offer a new slant on the hen-egg dilemma. [illegible])

ON LETTERS

BECAUSE of the large number of letters we receive, we find it physically impossible to print them all in full. May we request our correspondents, therefore, to make their letters as brief and to the point as they can; as this will aid in their selection for publication? Whenever possible, we will print the letter in full; but in some cases, when lack of space prohibits publishing the complete letter, we will give a resume of it in a single paragraph.

There Should Be Some Meat

Editor WONDER STORIES

Re the question you raise in the letter column of your magazine, let me say that I like my stories to have some depth, some penetration to them. Francis Flagg's story for instance, comes dangerously near to depicting gangster conditions as they are in America today. Also his yarn is original [illegible] Wesso who wrote a similar story, "The New Accelerator," didn't have his hero accelerated through his *glands*. Whether the underlying motif of a story be sociological, purely scientific, or compounded of sheer human aspirations and longings as in Clark Ashton Smith's "Beyond the Singing Flame," nonetheless the story should have something to it besides just action, although I don't despise action or an [illegible] yarn, now and then. [illegible] I like [illegible] stories much [illegible] because he writes [illegible] with [illegible] Also [illegible] be sure [illegible] to a story. Yours for WONDER STORIES.

Paul Thibault.
San Diego, Calif.

(Mr. Thibault is evidently not one of those [illegible] swept away by a "wild west story of the [illegible] It is our policy to demand of our authors that there be something to our stories more than action. Action is only the vehicle of the theme, the means by which the author's point is illustrated. But a point there must be, However, we want our readers to give us their comments, what is the most important element in a science fiction story? *Editor.*)

Depend Upon the Illustration

Editor WONDER STORIES

It's just like regaining a dear old friend—this marvelous "comeback" of WONDER STORIES! After a dismal year, during which time my interest ever lagged down toward indifference, she has returned—bigger and better than ever!

It's been a long while since we've had an all-Paul illustrated book. Of course, we've had one or two of his remarkable drawings each month, but these were spaced in between others so poor that I could scarcely enjoy your periodical. When I read a story I depend upon its illustration to give me the primary impression. If this impression is poor, then oftimes I am prone to look upon the story as such.

Again, seeing his wonderful work on the cover of the Fall QUARTERLY and the latest monthly, has caused me to literally seethe with curiosity. I want to know something of this genius. So herewith this letter takes the form of a frantic plea. I feel sure that I have practically all the science fiction fans behind me.

Why, in the name of all that's holy, can't you introduce Paul to us? Here we have been praising his work for over five years, and as yet, we haven't the slightest idea as to who he is, his age, or what he looks like! WHO IS FRANK R. PAUL? For Heaven's sake tell us. If you can't inform us through the pages of your WONDER STORIES, tell us where we can find out.

All stories in the January issue of your magazine were excellent.

"Martian Guns," started off with a lurch which picked me up and held me suspended until its whirlwind climax.

"The Derelicts of Ganymede," was a clever combination of love, science, adventure, humor and the fantastic. This Campbell is a capable writer. When an author is successful in weaving all the above mentioned ingredients into a tale, he's good!

"The Duel on the Asteroid." A great story! Obviously written by Miller because of the style which is colorful and alive—even though he is eternally writing *of* things "sere, blasted and drear." I know of no other youth in the writing field with such a golden future as P. Schuyler Miller.

"The Crystal Empire." I enjoyed this. The

(*Continued on page* 1195)

WHAT PRICE SUCCESS IN RADIO?

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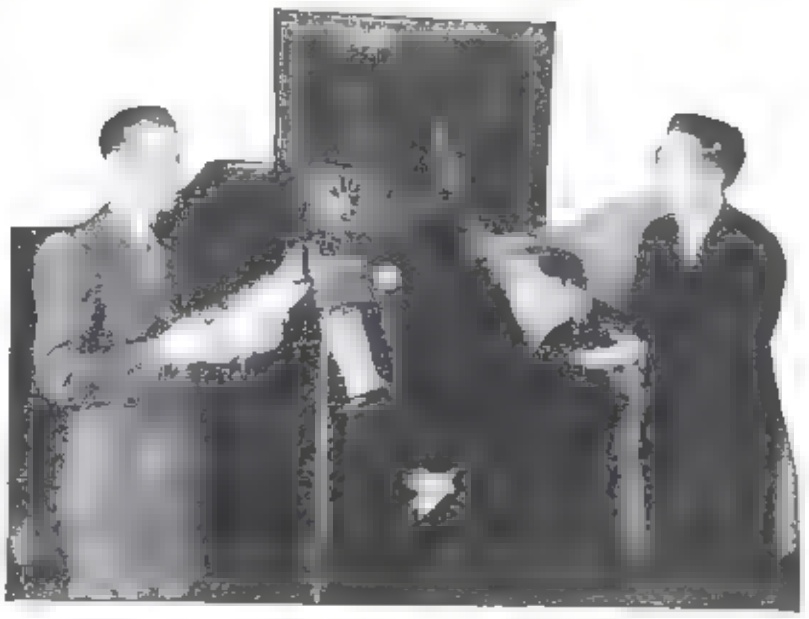

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SCIENCE QUESTIONS AND ANSWERS

(*Continued from Page 1193*)

Now by Newton's Law of action and reaction the velocity imparted to block 1 will depend on the equation MV = M1V1 where M is the mass of block 1, V is its velocity, M1 is the mass of block 2 and V1 is its velocity. In other words the momentum MV imparted by the explosive to each of the two blocks will be equal. Let us assume that one layer of explosive has the power to impart to one block a velocity of 20 feet per second, and then see how this will work out.

When explosive S4 is set off, block 5 will move to the right at 20 feet per second. But inasmuch as the rest of the blocks have a total mass of 4 times that of block 5, their velocity will be 20/4 or 5 feet per second, to the left. This follows from the above equation for the equivalence of momentums.

Now explosive S3 is set off, giving block 4 a velocity to the right of 20 feet per second, and giving to the other 3 a velocity of 20/3 or 6.66 feet per second. This added to their former speed of 5 feet per second, makes a total of 11.66 feet per second. Now S2 is set off and block 3 moves to the right at 20 feet per second, and 1 and 2 to the left at 20/2 or 10 feet per second, making their total velocity 21.66 feet per second. Finally S1 is exploded and both blocks 1 and 2 move apart at 20 feet per second, making the velocity of block 1 a total of 41.66 feet per second.

To bring this analogy down to the rocket, assume that blocks 2, 3, 4, and 5 are particles of fuel exploded, and that the explosive force are the layers S1, etc. As the fuel is exploded and the great pressure is created in the rocket's combustion chamber the gas particles move out of the exhaust to the right and the rocket and the remaining fuel move to the left by the equivalence of momentums. As the fuel is steadily burned, a given amount of fuel produces a greater and greater increment of velocity, since the mass of rocket to be moved becomes less. Thus if 1 pound of fuel is exploded and is exhausted from the rocket at an exhaust speed of 12,000 feet per second, it will theoretically give to the rocket a momentum of 12,000 foot-pounds per second. If the mass of the rocket is 100 pounds then the velocity given to the rocket is 12,000/100 or 120 feet per second. When the mass of the rocket has decreased to 50 pounds, (by the continuous burning of fuel) the burning of one pound will add to the rocket's velocity 12,000/50 or 240 feet per second.

A full discussion of the rocket principle and its operation is given in David Lasser's book, The Conquest of Space." *Editor.*)

READERS

If you like "Science Questions and Answers" in this magazine, you will find in our sister magazine, EVERYDAY SCIENCE AND MECHANICS, a similar department, greatly expanded called "The Oracle." Look for it, you science fans!

Rays and Rays

Editor Science Questions and Answers

Can you tell me where I can get a book on the transmuting of metals? Also where can I learn of the different rays that your writers speak of?

Frank B Ward,
Riverside, Calif.

(There are naturally no books on the actual transmuting of metals for this has not yet been accomplished, except in a few very costly laboratory experiments. But there are books that outline the nature of matter and what must be done in order to have transmutation. Two such books are, "Two Thousand Years of Science" by J. Harvey Gibson, published by the Macmillan Company, and "Foundations of the Universe" by Luckiesh, published by D. Van Nostrand Company.

The rays that our authors speak about are generally their own variations of the rays in the electromagnetic spectrum—heat rays, ultra-violet, radium rays, cosmic rays, etc. The books mentioned above will also introduce the general reader to the nature of the electromagnetic spectrum, and the qualities of the different rays. *Editor.*)

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THE READER SPEAKS

(Continued from Page 1192)

subject, however, is by no means new. The idea of an alien intelligence within the earth has been used quite often.

You ask the readers what more you can give them? All right, here you are. What about inside colored illustrations, photos of authors instead of drawings, more than one drawing to the story, and another contest?

In conclusion I wish to say that I would enjoy corresponding with any person anywhere who is interested in science fiction.

Herman Teeter
Russelville, Ark.

(Mr. Paul is modest. He wants his work to speak for him. But since the demand for some personal knowledge of him has become so great, we will try to satisfy it by inducing him to pose for a photograph. In the March or April issue, therefore, we will show you what Mr. Paul looks like.—*Editor.*)

Does Not Want to Mutilate

Editor WONDER STORIES:

After reading so many letters commenting on the petition for more science fiction movies, I can't refrain from adding my say.

You say that there haven't been enough of these petitions coming in. Well, no wonder! Anyone who thinks enough of the magazine to endorse it, also thinks enough about the magazine to think twice before mutilating it. This is my case exactly.

However, I'm going to do my bit in spite of this, so here's asking you for a few dozen extra blanks. You see I have an idea that I can start a traveling petition among my science fiction correspondents. Each one of them I feel sure can and will obtain a few signatures from his own circle of friends.

So send on the blanks and don't wait for readers to ask for those extras but enclose a few loose in each mag for a month or so and—well I think you will be surprised.

W. R. Baker,
Seminole, Okla.

(We are sending Mr. Baker a dozen blanks on his request. We understand and appreciate his desire not to mutilate the magazine, and for that reason we have had a goodly supply of extra blanks printed. Unfortunately it is impractical to attempt to insert loose blanks in the magazine, but we are ready to take care of the request for extra blanks.

Our readers should realize that it is only necessary for each reader to fill out one petition blank with five signatures to make a total so large that no movie company could ignore it. It is not necessary that a reader fill out a blank every month, but that he shall fill out just one. Petitions are coming in steadily in a goodly stream but not with the thunderous voice of our readers that we would like. We want to see this movement grow into a gigantic flood, whether it does depends on you.—*Editor.*)

Burns Him Up

Editor WONDER STORIES:

Once before it was necessary that "our" mag. be vindicated and an obliging reader stepped forward. This time let me do the vindicating.

That remark of Mr. Schwartz about the readers of WONDER STORIES being wide-mouthed, not wide-awake, burns me up. I'll send him a photo upon request! just to prove it—and the picture will be of myself, one of the greatest lovers of science fiction that there is. Wide-mouthed! Well I like that! I've yet to find such a science fiction fan. During my experience as President of the Boys' Scientifiction Club I came in contact with a mighty large group of young readers and believe me they were the brightest bunch of fellows I ever ran across.

One fellow a sophomore in high school and only 12 years old! Why most high school students are 17 and 18! Of course this was a rather unusual example, I'll admit, but in the majority of cases they were the leaders and intelligent ones. And boy how WONDER STORIES followers shine in Chemistry and Physics! Hop a rocket, Mr. Schwartz, and come visit a Chem. class with a W. S. reader in it. You'll see how wide-mouthed they are!

I wish you could send a copy of "our" magazine, with this letter in it, to Mr. Schwartz so he'd be sure to see it. And I'd like about nine-tenths of the school teachers in the U. S. A. to read it, too. They make me sick. Their usual complaint is Edgar Rice Burroughs. I wrote this famous author to see what he'd have to say for himself. And what an answer! It's curtains for any teacher, now, who says his work is trash. I just pull the letter on 'em and they've nothing to say.

Now just a word to Mr. Bailey who asks why WONDER STORIES does not cooperate with the other science fiction publications in putting the "Science Fiction Movie Petitions" over. Now Mr. Bailey: anyone who reads science fiction reads all the magazines and if they wouldn't send in the coupon from WONDER STORIES, they wouldn't bother to do so for any other. And if they *can't* buy *all* the pubs., then they naturally get the best. Answer is that they purchase WONDER STORIES. And "our" mag. has the petitions so there you are!

Forrest J. Ackerman.
San Francisco, California.

(Mr. Ackerman loses no time and stints no energy in coming to the defence of the young readers of science fiction. We have already stated our point of view, we leave the rest to our readers.—*Editor.*)

He Has Much Imagination

Editor WONDER STORIES:

For a long time I have been willing to write you a letter about our excellent magazine. But for some reason or other I have postponed this for another day and have not written. However now a good opportunity has come. It aroused with the list of persons who endorse the science fiction moving pictures. Enclosed you will find the coupon, signed by me and some of my friends. They have all seen here in Brazil "By Rocket to Moon" (which was exhibited under the title of "The Woman in the Moon") and also "Just Imagine" (with the name of "Phantasy of 1950") and would like to see more and better ones.

Now some words about the magazine. I like it very much. I usually read it all, even the advertisements. Clark Ashton Smith is your best author. He has such imagination. Proof? Well, look at "The City of the Singing Flame" in the July issue or at "Beyond the Singing Flame" in the November issue. These trans-dimensional stories are superb. I am sorry that the city of Ydmes has been destroyed in this last story, because now we cannot read more about that wonderful world.

In the issue of November I appreciated very much "The Superman of Dr. Jukes" by Francis Flagg and "Emperors of Space" by Jerome Gross and R. Penny (in the order named). "Tetrahedra of Space" did not appeal very much to me, although I was flattered because the events in the story are made to happen in my own country. Mr. P. Schuyler Miller seems to be a very young man and a beginner as a science fiction writer.

Even so, if he continues writing he will improve.

I think the idea of publishing the pictures of the authors, as you have always done is fine. But now a suggestion: as you are using a smooth paper now, what about real photographs of the authors?

Gee! But this letter is getting too long! I must close it. Apologizing for my bad English,

Dieno Castanho,
San Paulo, Brazil

(We are very glad to get from distant Brazil the petition of Senhor Castanho and his support for our movie petition. We can appreciate that it must have been impossible to translate into Portugese the idiomatic expression, "Just Imagine." However a science fiction movie should be good no matter what name it is known by.—*Editor.*)

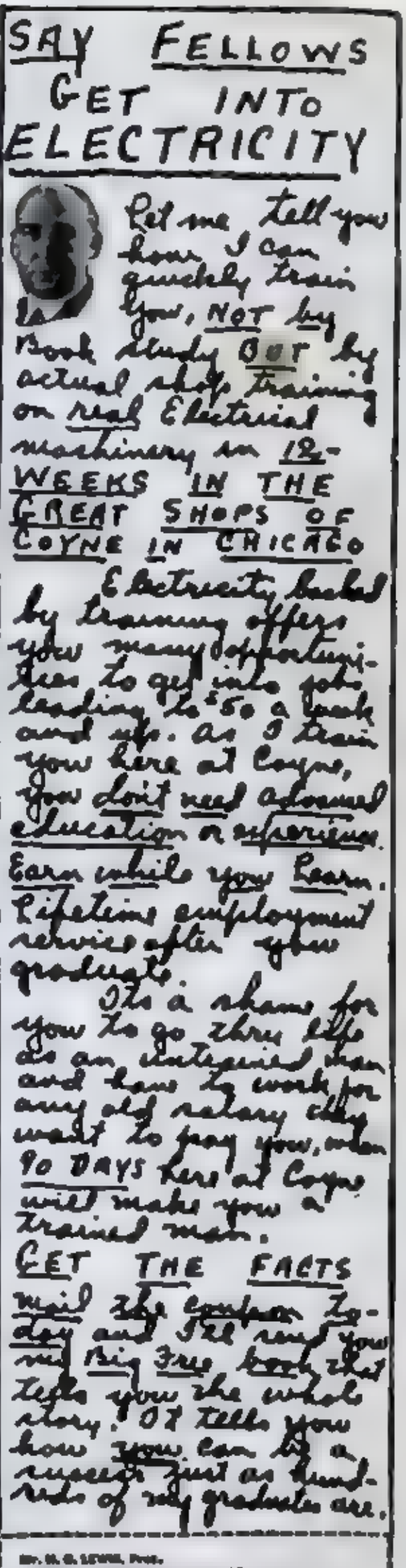
In Defense of Non-Protoplasmic Life

Editor WONDER STORIES:

It is never very easy to argue against someone who knows as much or more about a subject than you do. For that reason I am a bit uneasy about the present battle with Herr Ley. However, I will do my best, and since Mr. Berlow seems to have come under the standard I have raised, with his "Crystal Empire"—which, by the way, is not quite as open to Herr Ley's objections as my "Tetrahedra," (since he explicitly mentions protoplasmic substances as being the vital part of his crystalline monsters) I hope, at any rate, that he will rally on the side of the living crystals if he is needed.

The first silicon hydride, silico-methane or silicane, SiH_4, was prepared in 1857 by Buff and Wohler. Wohler is the famous Friedrich Wohler, the father of organic chemistry, who prepared urea from inanimate materials in 1828. He prepared a number of other members of the series as well, and, among other things, discovered the elements aluminum, beryllium, and yttrium and just missed vanadium. Buff was probably one of his students at his famous teaching-laboratory at Gottingen. Herr Ley probably knows all this, but the majority of the readers will not, and as this answer is to ap-

(Continued on Page 1196)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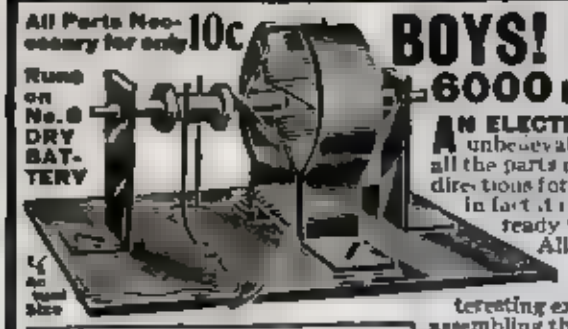

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THE READER SPEAKS

(Continued from Page 1195)

pear in their—our—section I am including it.

The silico-aliphatic series of hydrides has been built up to silico-hexane, Si_6H_{14}. All but silicane are colorless liquids which decompose violently in water. Most of these compounds do this—the reason why the "Tetrahedra" dreaded a wetting. A polymerized acetylene, (Si_6H_4) has also been isolated—a crystalline yellow solid.

So much for the simple hydrides. They prove that a silicon bond is not impossible, though it is very unstable. A large number of simple and mixed halides of the four known halogens (fluorine, chlorine, bromine, and iodine, with element 75 as yet unknown) are known. I am including a table of some of them, though it is too long to print. Sufficient to say that they are also decomposed by water, though they are stabler than the hydrides.

Mellor in *"A Comprehensive Treatise on Inorganic and Theoretical Chemistry"* states that various other derivatives have been formed, among them about fifty tetra-alkyl silicanes, which resemble petroleum and are quite stable to water and lye. The tetra-aryl silicanes are even more easily formed than the corresponding carbon compounds! For the benefit of the readers, the tetra-alkyl compounds contain long chains of carbon atoms linked with hydrogen in place of the simple hydrogens in SiH_4, while the tetra-aryl derivatives have similar carbon-hydrogen groups containing the characteristic formation of the benzene ring.

I have no desire to turn this into a treatise on chemistry. I realize that the formulas, which I would like very much to give—particularly the structural formulas—are beyond the range of the ordinary printer and the patience of the average reader. I will add a few more facts, however.

Silico-oxyhydrides corresponding to some of the organic acids have been found and are insoluble white powders. Nitrogen compounds, silicosamines, which correspond to the carbon compounds at the base of the organic proteins, have been formed and are stable.

The former may be the characteristic linkage in quartz and glass, and is said to exist in the liquid and probably the gaseous quartz in just such $(SiO_2)_3$ units. In both the chain linkage is from silicon to silicon, as with carbon.

Under suitable conditions, then, a silicon world which parallels but does not duplicate our carbon world is possible. Many of the simpler compounds are easily destroyed by oxygen and water, but when the hydrogen atoms are replaced by complex carbon groups, forming a mixed carbon-silicon system, the compounds are stable and greatly resemble the corresponding carbon compounds. *And there are silicosamines which might be the basis of a series of silico-proteins!* Mr. Berlow allowed for these mixtures, while I did not, specifically. However, I never dissected one of my "Tetrahedra" to see what *was* inside.

The SiO_2 sand— of which Herr Ley speaks could be excreted to form a shell, as some of our protozoa are able to do, or, in colloidal form, could yield a gel or jelly that might be a very important part of the living organism, due to its power of absorbing gases and liquids. There is true efficiency for you! Using waste to build up the body! Still, the larvae of certain water-insects do it.

What is life—the actual activating principle that separates the animate from the inanimate! Would a perfectly formed chemical duplicate of a living thing automatically live? I doubt it. Arrhenius, you remember, went so far as to say that the stuff of life itself was spread through the Universe in the form of infinitesimal spores, driven from planet to planet and from star to star by light-pressure, as actual fern-spores may be. When they fell into a medium capable of sustaining life, a living thing, the progenitor of a race, resulted. *May not the first gelatinous, protoplasmic creature have been a silicon or a silico-carbon compound!*

Gradually evolution has replaced the unstable silicon by carbon, for living compounds must surely evolve as well as living beings. You and I are the result. On another world, on Mercury, the "Tetrahedra" resulted. Chemistry is far from knowing all that is possible, or when or where. Dogma is out of date. Working as he is on the "impossibility" of rocket flight, Herr Ley knows that. Still, where things are possible, they may be improbable, and an extensive silico-life on Earth is probably that.

I want to thank Herr Ley for his interest and kind remarks, and the editors for enabling me to defend myself here. This letter has grown far too long, but the evidence is bulky and I have tried to place it within the grasp of at least a part of the general readers. I recommend Mellor's volume on Silicon, in the series I have named above, to the reader who wants more. I admit that I stopped there, though. If the battle is to continue, I am willing to go back

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THE READER SPEAKS

to the original sources and do my best to get first-hand opinions. I hope, though, that we can form a truce until I violate another postulate of classical science in the name of imagination and the possible. Then I will welcome Herr Ley's attack—by rocket, perhaps—and do my best to give him as good as he sends. Active disagreement will get us a lot further than passive acceptance. Remember, science fiction is one of the few places in popular fiction—perhaps the only one—where reader and writer are on a par and can fight it out, man to man, possible vs. impossible, with the ladies for reinforcements instead of referees. The best part of any theory or any story is the controversy it arouses, for controversy means that someone, somewhere, has had to do some thinking.

P. Schuyler Miller,
Scotia, New York

(Mr. Miller offers a strong defense to Herr Ley's letter in the January issue that non-protoplasmic life is impossible. We hope that Herr Ley will answer this defense or either accept it or bring facts to refute it. We have asked Sidney Berlow, author of "The Crystal Empire" who, like Mr. Miller, is a student of chemistry, to answer Herr Ley's letter. So a merry battle on this interesting question is in order, with all comers invited.—*Editor.*)

The Finger of God

Editor WONDER STORIES:

A discussion of time and its attendant characteristics eventually brings forth many complexities some of which I hope you can shed light upon, if only in a theoretical manner.

In the first place, if time is an unceasing entity where events are unchangeable, then everything is predestined. What we call fatalism must be more than a belief—it must be an actuality. This argues a creation of time—an argument in itself a paradox because such a concept would disrupt the immutability of the stream. Furthermore were there such a creator, he, according to our time concept, would be unable to alter its course (change any thought or event).

This leads to bewilderment because it is inconceivable that one capable of composing such a procedure should be unable even remotely to influence or control it.

If we pursue this line of reasoning we are met with such a multitude of self-contradictions that clear thinking becomes intensely difficult. For this reason, for the reason that I know your space is valuable, and because I am scarcely prepared to make a further logical discussion, I shall not disagree.

I would like to state that John Taine's "The Time Stream" while vague and a bit dry yet presents more possibilities for intriguing conjecture than any other story in your previous issues.

Meyer Katz,
Ogdensburg, N. Y.

(If time were a closed stream, then perhaps Mr. Katz would be justified in taking a fatalistic attitude toward events. Those who look upon the past, present and future as being one, draw the analogy to a fly crawling across a large picture. The fly "happens" across various parts of the picture that are already formed, and the fly like us might think that he created the picture, or to use our analogy, that he created the events of life. So it may be that we crawl through time "happening" across the events that compose our existence. But they are already there.

If all that is true then a certain amount of fatalism is possible, and one could say, "Oh what's the use: the future is determined for us anyway." Yet there is a fallacy. If we knew that future, then it would be useless to struggle. But since we do not know it, we can then exert our best effort in doing what our will dictates, and we can hope that what we expect from life, what we try to obtain, *is just what the future holds in store.* After all, every person every day faces numberless choices as to courses of action. Apparently he can make up his mind to do a certain thing or not do it, and to do it any number of ways. Then since we apparently have free will, then let us exercise it in the belief that the future is about to smile upon us.

As to the creator of time and events, that is a philosophic question. It is possible that the universe itself is a great force, and is slowly working out its millionfold ramifications, and that time and the progress of event are simply a result of the first seed. Or as Sir James Jeans puts it, perhaps in the beginning the finger of God stirred the ether once, and everything that has happened since is an inexorable result of that one act. If that is true it is not necessary for any entity to interfere further with the progress of the cosmos.

However, we invite our readers to comment on this absorbing question. *Editor.*)

(*Continued on Page* 1198)

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THE READER SPEAKS

(Continued from Page 1197)

Bring on Coblentz!

Editor WONDER STORIES

I think I'll make a rule of it from now on not to criticise stories. One reason is that I'm sure the readers must be tired of a dozen different letters all saying this was good and this wasn't, etc. All the reports generally conflict, anyway, so what's the use?

It was a very splendid idea to ask the readers what, of the five different things essential in a science fiction story, they considered most important. The answer is, it all depends. Take number 1, fast action. That's alright provided Edmond Hamilton or Ray Cummings writes the story. Number 2: a good plot. Not always necessary. Francis Flagg did "The Superman of Doctor Jukes" a wonderful tale with an aged theme. Number 3: a unique scientific idea. There you have it! A unique scientific idea! They're hard to find these days. But when you get one!

I know I'll never forget "The Nth Man" by Homer Eon Flint. It is a story that will live forever. It's new, different, amazing. It has a—oh, I give up! At present I'm reading a book that is equally astounding. The scientific discovery in it is even more awing, perhaps, than that of Flint's immortal tale. The book, should any of you care to read a yarn with a real, startling idea in it, is "The Vicarion" by Gardner Hunting. (Probably Mr. Brandt has read it. He can tell you. Let me take this opportunity to welcome him to the staff of "our magazine.) Number 4: a description of some strange place with plenty of local color. Fine when handled by Clark Ashton Smith. And lastly, Number 5: a story with a moral or lesson. Bring on Stanton A. Coblentz!

Forrest J Ackerman,
530 Staples Avenue
San Francisco, California.

(Mr. Ackerman offers a sensible answer to the questions we put to our readers, "what is the most important element in a science fiction story?" It depends, he says, on who has written it.

We have found, however, from the letters submitted on this question, that originality of plot and scientific theme is most important. But we want to get a better index of our readers' opinions and invite more answers.—*Editor.*)

BOOK REVIEWS

SIGNALS FROM THE STARS by George Ellery Hale. 138 pages, stiff cloth covers, illustrated. Size 5 x 8. Published by Charles Scribner's Sons, New York. Price $2.00.

Dr. Hale, who is Honorary Director of the Mt. Wilson Observatory, treats in this little volume of the possibilities of large telescopes in exploring the sky, and the building of the 200-inch telescope. Tracing the history of the instrument he shows how our knowledge of interstellar space has been progressively increased by each new telescope. He believes that the 200-inch telescope now being built for the Mt. Wilson Observatory will be a success and that a 300-inch telescope may be constructed and used with profit. Dr. Hale is careful to point out that the great sums invested in our large observatories do not return any direct practical return to society, though they extend our knowledge and understanding of the external world and broadens our views as to the nature of the universe. But Dr. Hale does believe that from our studies of the great solar furnaces and of other planets we will obtain knowledge that will ultimately serve commercial and industrial purposes.

TAMING OUR MACHINES by Ralph E. Flanders, 250 pages, stiff cloth covers. Size 5½ x 8. Published by Richard R. Smith, New York. Price $2.50.

Into the welter of controversy about the menace of the machine, Mr. Flanders pours the soothing balms of the industrial engineer. He neither believes nor disbelieves in the value of the machine as an idea, or as a means of transforming our lives toward greater happiness, he is willing to judge the machine by its works. He sees that the machine has been misused, that it has brought into our lives along with a great flood of machine-made products, considerable dirt, noise and ugliness. But he is confident that the engineer, who himself possesses a great sense of beauty and fitness and who realizes the value of the aesthetic in our lives, will help to tame the machine to greater usefulness. The book is a general survey of the machine, its history, growth and influence, and a suggestion

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PHILOSOPHY AND MODERN SCIENCE by Harold T. Davis. 335 pages, illustrated, stiff cloth covers. Size 5¾ x 9. Published by the Principia Press, Bloomington, Ind. Price $3.50.

Professor Davis, who is Professor of Mathematics and the Philosophy of Natural Science at Indiana University, attempts to probe by the philosophic method to the bottom of the puzzling problems of modern science. Tracing the history of science briefly he goes on to a discussion of the philosophical background of modern physics, the problem of the ether and its relation to matter, time, space, the fourth dimension, the nature of gravitation, the atom concept, the "uncertainty principles," the quantum theory, and wave mechanics, cosmic radiation, etc.

His purpose, in sifting through these profound physical problems is to attempt a suggestion of what the modern man can believe. Our philosophic basis of thinking should, he believes, rest not upon abstract logic, but upon what we know of the world as presented by science. But in summing up the findings of science, Professor Davis is notably vague on what attitude we can adopt toward it. He hints that science can never give a satisfactory answer to the universe and our place in it; that chance governs much; that the free will in matter may equal the free will of men and therefore destroy the careful rules of cause and effect upon which we rely.

But the book should be worth reading, for the author has enjoyed writing it and delving into unexplained subjects. The reader should derive mental stimulation with which to form a philosophy of his own, if nothing else.

COMMUNICATION by David O. Woodbury. 280 pages, illustrated, stiff cloth covers. Size 5¾ x 8. Published by Dodd, Mead & Co., New York. Price $2.50.

This book is the first of a series of "The Stories of Man's Achievements." It traces from the earliest beginnings the threads of human intercourse, and the ways in which man has developed the far-reaching systems of communication upon which our civilization depends. The author pictures the coming of the post, the manifold methods of signalling, the dawn of science and the laying of the groundwork for the many technical methods of message sending which we have today.

In succeeding chapters comes the dramatic stories of the telegraph, the telephone, the radio and the mails. And then having finished with history, the reader is led through the many ramifications of the communication plant of 1930. He journeys with a radio message around the world, he learns how communication helped to win the Great War, he learns the numerous special applications to which message sending has been put. And in a later chapter he is shown how communication affects the public welfare, in great disasters, in crime detection, in education. And lastly he delves into the laboratory secrets of television and ends up with a prophecy as to what communication may do for us in the future.

THE DOCTOR LOOKS AT LIFE AND DEATH by Joseph Collins, M.D. 315 pages, stiff cloth cover. Size 6 x 8½. Published by Farrar and Rinehart, New York. Price $3.00.

Appropriate to the title of this book, which is the third of the "Doctor Looks At" series, Dr. Collins surveys everything in the heavens above and the earth beneath. Although the book is professedly a series of case histories of neurotics affected by sexual disorders, it has a lengthy introduction, comprising one quarter of the book in which Dr. Collins expounds upon the decline of religion. Telling theologians to keep their hands off sexual matters because it's none of their affair, the good doctor proceeds to give us a medico's opinions upon religion.

In the last quarter of the book we find the good doctor as a literary critic; and only in the middle section is he the neurotic specialist. Although his discussions of a dozen blighted lives are interesting, they are neither penetrating nor carefully arranged. They come in fact as a disappointment. It is pretty well recognized today that sexual neurotics can be cured if their ailments are recognized. One of the chief ailments that Dr. Collins finds is a sense of sin in people regarding sexual matters. He believes, as is also pretty well recognized, that if we can take a more normal and healthy view of the sexual functions, the inhibitions and repressions that distort so many minds, will vanish.

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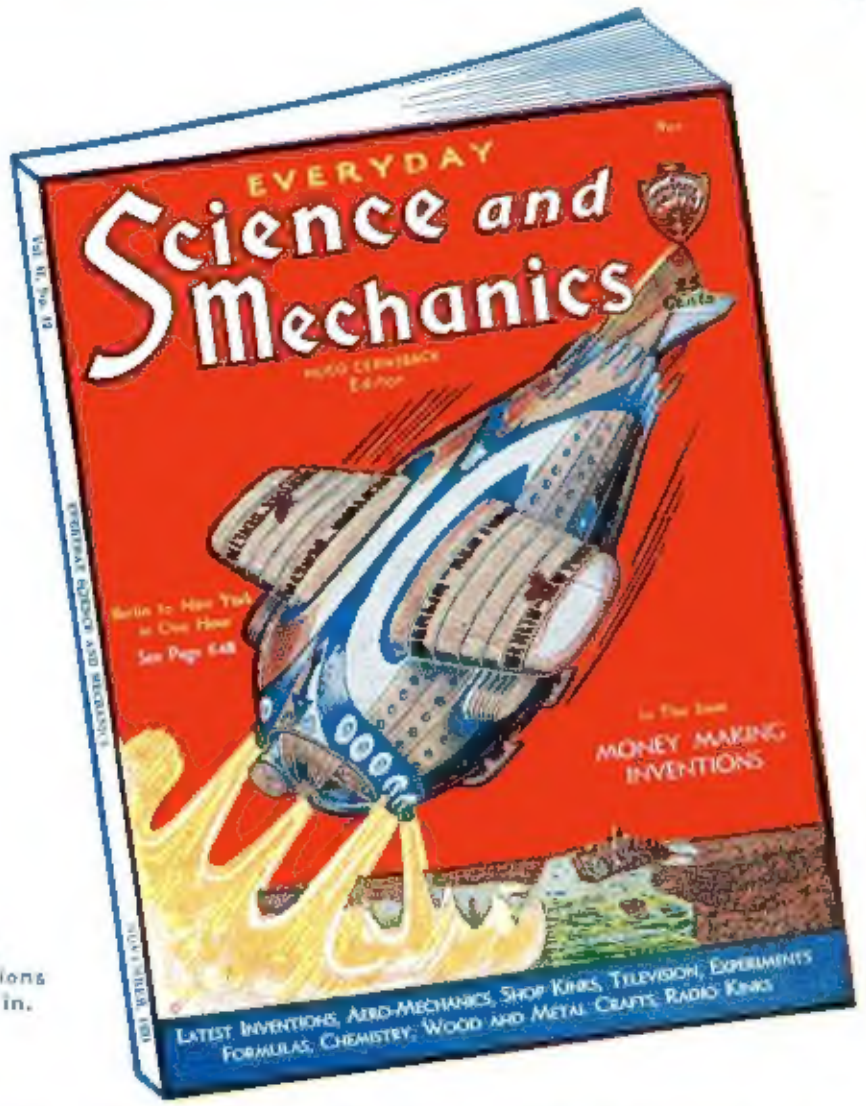
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